July 17–23 1987 Vol 6 No 28 60p

# POPULAR Computing WEEKLY

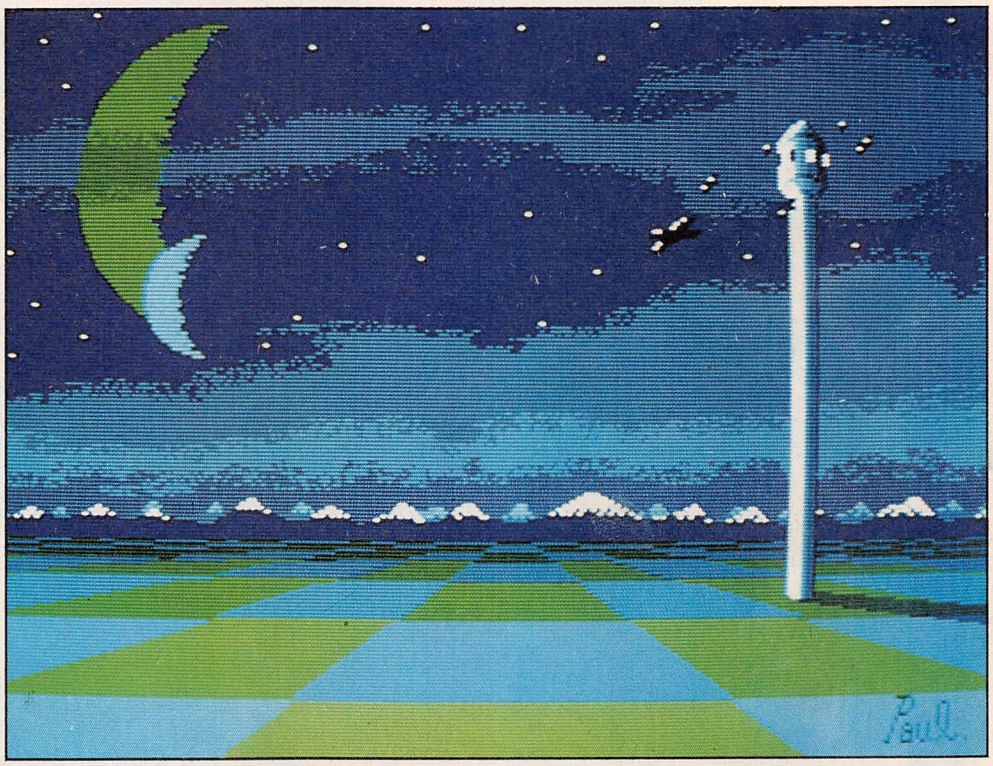
## NEWS DESK
Atari STFM price cut in September

Spectrum Plus 3 – streetdate and software prospects

## GRAPHICS
Want to create this picture? Step by step guide inside

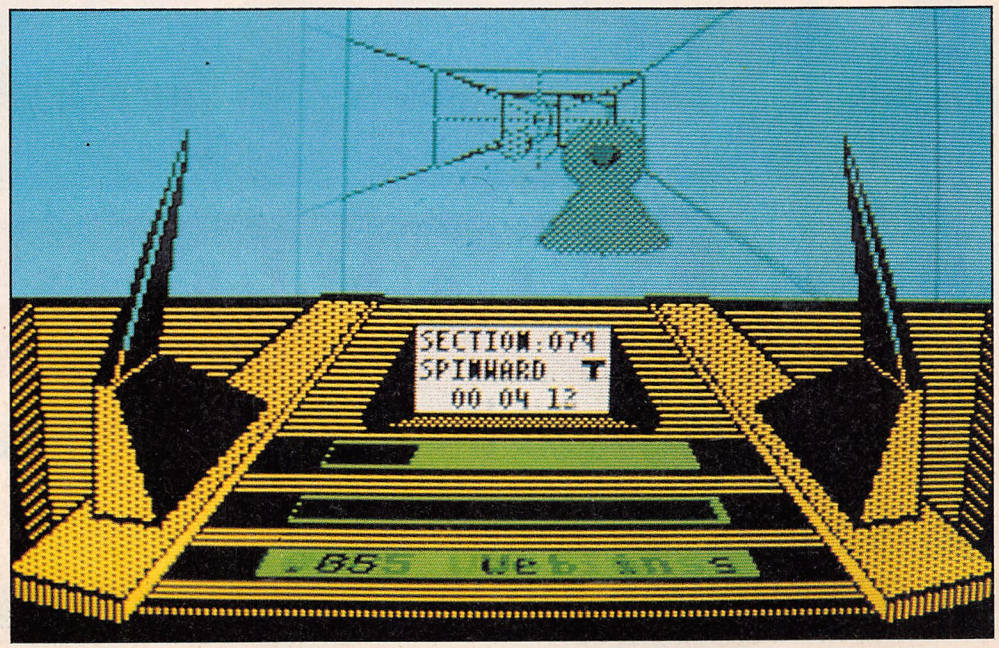
## SOFTWARE
Extend Basic on your Spectrum 128

## HALL OF FAME
Be amazed by Micronaut One from Nexus



Wizard's Tower by Paul McKinley

Micronaut One

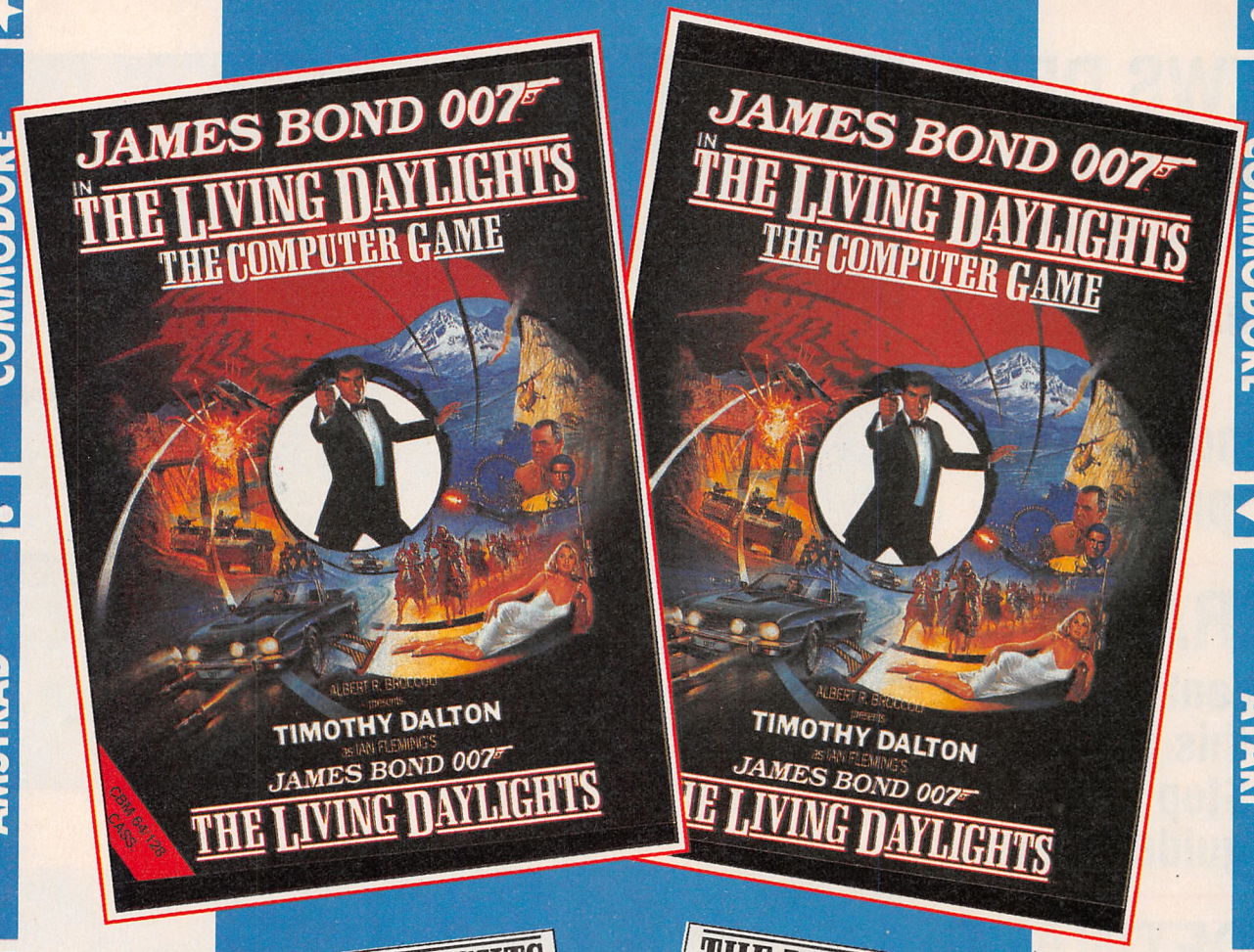


ATARI COMMODORE SPECTRUM

SPECTRUM COMMODORE AMSTRAD ATARI

AMSTRAD COMMODORE ATARI SPECTRUM

# N·E·W RELEASES




THE LIVING DAYLIGHTS

THE LIVING DAYLIGHTS

## WOOLWORTHS

*A Great Deal in Entertainment*

VISA

* At selected larger stores.

* Items subject to availabilty

COMMODORE SPECTRUM AMSTRAD

ATARI COMMODORE SPECTRUM AMSTRAD

July 17–23

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## Games

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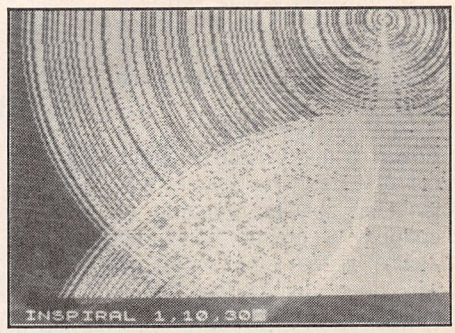
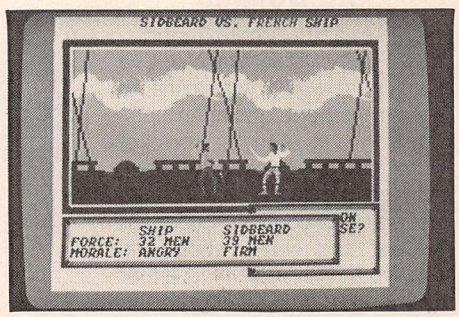
**42 Hall of Fame** It's nice to see the Spectrum can still be served by games of top notch quality, as Nexus's *Micronaut One* proves.




*Top: The Prestel/Telecom Gold Gateway screen. Above: Beta Basic extends your programming horizons on 128K Spectrums. Below: Take to the high seas with* Pirates *from Microprose.*

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ABC

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**Popular Computing Weekly. Tel: 01-437 4343.**

# LETTERS

## Amiga clock cycles

Does anybody else think that Commodore's advertisement for the Amiga is a bit misleading in its wording?

I am referring to the line that says that it runs "at over seven million steps per second". I have conducted a small poll amongst friends on what they interpreted a step as being, and their unanimous verdict was that it was an 'average' machine code instruction.

Now I've seen a 68020, the full-blown 32-bit version of the Amiga's 68000, with a clock speed of almost 17MHz, quoted as running at 2·5 mips (millions of instructions per second), so I doubt very much that the Amiga's 68000, which has a clock speed of 7MHz, is capable of 7 mips.

Commodore's definition of a step appears to be one clock cycle. I have yet to see a processor that can do anything in a single cycle.

Commodore has, in the Amiga, a good machine capable of turning its owners into fanatical zealots prepared to conduct a postal 'holy war' against all that is not Amiga, so why does Commodore find it necessary to be ambiguous?

If Commodore means clock cycles, why doesn't it say so?

*A W R Crawford*
*Penicuik, Scotland*

## Letter of the Decade

AAAAaaarrrrggghhhhhggg! Sorry, I can't help it, I've just opened your magazine to the letters page again, and discovered yet another pair of prime daft letters. Namely these silly people (I assume they're people) who continue to gibber, gabber and woffle about the relative merits of owning either A computer or B computer.

If B is better than A, but B costs noticeably more than cheaper A, which isn't that much worse comparable with the rest of the alphabet, then obviously B is still better, but A is easier on the pocket.

This appears to be an extremely complicated turn of events, beyond the comprehension of a number of people. The result of this miscomprehension is that a number of B computer owners feel that A computer owners bought their computer out of ignorance of the B computer!

And on the other side, the poor old A computer owners get very annoyed, and wonder why the richer B computer owners can't understand what difference a 100-odd beer tokens makes!

So the A owners call the B owners silly names, and the B owners reply to the A owners with a blinding array of silly stats which the A owners knew anyway.

At least if you don't print my ramblings could you put a few sarcastic comments to the guilty letters if this continues. I know you've already devoted a page with an explanation but it doesn't work!

*Gavin Johnson*
*Abinger Hammer*
*Surrey*

**This should win a Letter of the Decade award. Ed.**

## I'm no Einstein – help!

Is there anyone who can help me? I have just acquired a Tatung Einstein computer, but unfortunately there is no system disc, demos or manuals.

I do not know anything about this type of computer, except that it has twin half-megabyte drives and needs an O/S on disc before I can use it to any extent.

I would also like any advice on programs, programming or anything else to do with this computer.

*V A Andrews*
*356 Yorke Drive*
*Newark, Notts*

**You can contact Tatung at Stafford Park 10, Telford, Shropshire, telephone 0962 613111, for advice.**

## Canon blank wall

I have recently acquired a Canon X-07 portable computer that I am very pleased with except that it has a fault with the cassette port and I need some new pens for the X710 printer.

Unfortunately none of the dealers on the island can help me, and I have written to the Canon UK address given in the handbook, but with no success.

I am therefore in the position of having a useful tool that I will eventually have to discard unless someone can advise me on where I can get something like a service manual and spare parts for the machine.

*N J Ozanne*
*Guernsey*

**As you are unable to contact a dealer direct where you are, your best bet is going to be through the manufacturer, either for direct help or a list of stockists.**

**I would suggest that Canon's memory needs jogging about your previous letter. Why not telephone them, on 01-773 3173?**

## Amazing, that technology

In response to the Ziggurat article titled "The never-ending march of technology" by P Rowley. These so called revolutionary machines are only revolutionary because they have entered the games market at the £500 mark.

There has been a revolutionary machine produced on 32-bit technology that uses RISC (Reduced Instruction Set Computer).

The second point is the Motorola MC68000 chip series are in fact 32 bit architecture.

The third point is that the machines he envisages are going to be giant refrigerators.

The fourth point is that if he had been watching any computer programs on the television he would know that computers can produce photographic quality pictures.

However, after all that is said, there will be new and more exciting computers in the field of laser computers and organic computers. Laser computers will run exceedingly faster than electronic computers. Organic computers will run much slower than both of the others but will be like the human brain.

*R J Gendon*
*Norwich*

## Stubborn as a mule

You may recall my letter expressing my disappointment at the refusal by Ariolasoft to help me with regard to the upgrading from cassette to disc of the program *Mule* (see *Popular,* December 18, 1986).

I thought you might like to know that the story has a happy ending!

I read in *Popular,* March 27, that Electronic Arts, publisher of *Mule,* was opening an office in London to serve the UK market. I therefore decided to contact the company direct with my request.

Not only were they pleased to help but also they went out of their way to obtain the disc version of *MULE* for me within a few days.

I would just like to say that if this is the sort of service the customer will receive in the future, surely Electronic Arts, armed with its impressive catalogue of software, cannot fail to make an impact on the UK market.

I, for one, wish them every success in their new venture.

*Paul B Nash*
*Wilmslow*
*Cheshire*

## Not quite shareware

Prado Basic is *not* shareware — it is just GW-Basic being renamed and offered as shareware. If you look through the code with DEBUG, you will see the message "Licensed material – program copyright IBM". For more details, see *Personal Computer World,* August 1987, page 71.

Secondly, forget the Amiga, forget the ST – just look at the Archimedes. OK, so it's a little more expensive. But look at the speed, the graphics, the sound (well, listen to it then) and the other bits.

A decent, structured Basic with a built-in assembler (beats ST Basic any day!) and a large amount of support promised, as most major BBC companies should be supporting the Archimedes. I know that I will (but, then, I'm not a major BBC company, am I?).

*John Yeates*
*Jersey*

## Who is the expert?

Several months ago I bought a PCW 8256 from one of Dixons' shops. This machine was purchased on the understanding that technical advice would be available from 'the computer expert'.

Unfortunately I have never been able to consult with this elusive expert – on holiday . . . day off . . . sick leave . . . were some of the reasons offered as

to why the oracle was not available. So, after persevering with the machine, I eventually gave up and used the machine only as a typewriter.

However, a few days ago a fault developed in the machine, which meant it was not even serviceable as a typewriter, so I had to be rather more persistent searching for advice. Dixons quoted me a likely price of £60 to correct the fault. When I said the cost was prohibitive for what appeared to be a simple fault, I was informed of all the technical, scientific operations which would be required to repair the machine, of course knowledge far beyond my understanding.

When I was passing the local one-man operation (Computermart, Southbourne) I called in and mentioned my problem to him, hoping he may be able to quote a lower price to mend the machine. He suggested I try a squirt of WD40; I did, and the result was a working computer.

Neither of the two gentlemen had seen the machine but one was at least able to offer a 'try simple option first' before riding out on the range. This kind of experience cannot help the computer trade. I was just fortunate to find an honest and knowledgeable person or my computer days would have been over.

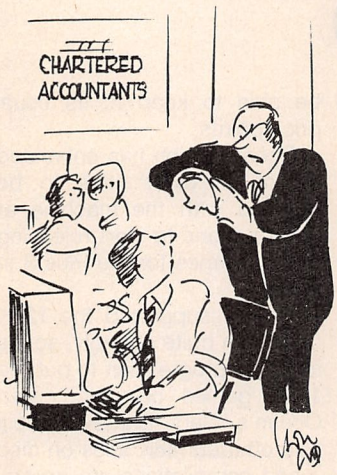
There is a potential market amongst the older people who completed their school days pre-computer, who would enjoy the fun of using a computer but find it difficult to tune into the new technology.

I wish some bright spark would dream up a system for a thicky such as myself to learn the full benefits of a computer. If I became really proficient I may even be able to speak to Dixons' staff almost on the same level.

*Mrs B Lomas*
*Bournemouth*

**Interestingly enough, one of the printers in our office developed the self-same fault, judging from the print-out you sent us with words underlined and mysteriously scored through (not reproduced here).**

**At a bit of a loss, we removed a few parts, looked at them, put them back in again, and it's worked perfectly ever since.**




*"Do you realise that it's taken you longer to load the disc than it took the Archimedes to forecast our entire year's profit and loss forecast?"*

## Return of the robots

In reply to Stephen Chandler (Letters, June 26) regarding the DIY robot kit as featured in *Popular,* March 1985: the original kits *are* still available from Greenweld Electronics.

The PCW buggy kit involved a very simple circuit which could be hooked onto a big track gearbox, and controlled by an popular home micro.

All parts and necessary sockets can be supplied at the following prices:

| | |
|---|---|
| Spectrum | £13.95 |
| C64 | £11.95 |
| Vic 20 | £11.95 |
| ZX81 | £13.95 |
| BBC | £12.95 |
| Amstrad | £12.95 |

Full instructions and circuit supplied free with kit, or 50p separately, from Greenweld Electronics, 443 Millbrook Road, Southampton SO1 0HX, telephone 0703 772801.

*Lee Barton*
*Runcorn*

**Lee is absolutely right. Our apologies for printing the wrong information before.**

## Communications breakdown

I refer to the feature "Comms up to Date" which appeared in the June 19 issue of your magazine. Unfortunately there were a number of errors in this, which gave the wrong impression about our products, etc.

The Spectre Comms Pack for the Sinclair Spectrum was designed to *replace* the VTX5000, not to be an adjunct to it. Indeed, it was intended to be used with the Tandata QMod Modem principally, although it will also support most RS-232 modems via a serial port.

Ian and I are ex-OEL employees, not Prism. OEL designed and manufactured the VTX5000, sold under the Prism name.

The Comms Rom offers most of the well-proven facilities of the Comms Pack to users of the VTX5000, including Bulletin Board access. It is *not* an upgrade to our Comms Pack, but to the original VTX5000!

*Laurence Cook*
*Spectre Communications*

## The economics argument

Everybody is entitled to their own views however intelligent and informed they are or not. I wish people like D C Taylor of Somerset would not try telling us that black is white with their arguments. Under this summary sum up of the computer market, the Cray II would be one of the best selling computers on the market. Well I am afraid it's not – because of pure economics. You try to get the best computer to fit your needs within a limited budget. And sometimes the Cray II, Acorn Archimedes, Amiga, ST, Amstrad or Spectrum are too expensive.

In my case I own an Amstrad, Dragon and a pocket computer. That is all I have room for at the time. I will purchase a 16 or 32 bit machine or a transputer based one next. I agree that the Amiga on paper looks better than the ST but it also looks more expensive.

*Mr M R J Gendon*
*Norwich*

We're sorry but *Popular Computing Weekly* cannot guarantee to reply to *all* letters requesting a personal answer. It helps us enormously if readers are prepared to have general queries answered on these pages, so, if possible, please do not send SAEs.

# Black under attack

In Game Two of our readers' versus *Colossus* chess tournament, the readers, playing white, have, as expected, chosen to attack *Colossus*'s weak pawn again.

*Colossus* has had to defend its other rook, but how should white continue its attack in this rather stodgy position?

## Your vote counts

This is your chance to eliminate the 'stodge' from white's side.

Send your suggested next move to *either* Inter-Mediates (*Popular* Chess), Freepost, Sawbridgeworth, Herts CM21 9YA (no stamp needed), *or Popular* Chess, Unit 2, The Maltings, Sawbridgeworth, Herts CM21 0PG (with a stamp). Please note that Freepost is slower than the normal service, so if you want to save stamp money, get your entry off promptly.

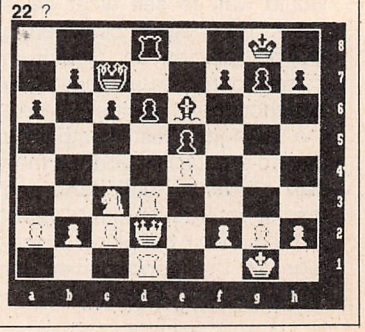
Only one vote per person please, and all entries must reach either address by Wednesday, July 22.

The move which gets the most votes will be entered into the game. Results and *Colossus*'s response will be published in two weeks' time.

*Next week, we return to Game One, where the readers are playing black.*

**Game Two**

| | | |
|---|---|---|
| **1** | Pe2-e4 | Pc7-c5 |
| **2** | Ng1-f3 | Nb8-c6 |
| **3** | Pd2-d4 | Pc5xd4 |
| **4** | Nf3xd4 | Pe7-e5 |
| **5** | Nd4-b5 | Pa7-a6 |
| **6** | Nb5-d6+ | Bf8xd6 |
| **7** | Qd1xd6 | Qd8-f6 |
| **8** | Qd6-d1 | Ng8-e7 |
| **9** | Nb1-c3 | Pd7-d6 |
| **10** | Bc1-e3 | Ke8-g8 o-o |
| **11** | Bf1-e2 | Bc8-d7 |
| **12** | Ke1-g1 o-o | Re8-c8 |
| **13** | Qd1-d2 | Nc6-d4 |
| **14** | Ra1-d1 | Nd4xe2+ |
| **15** | Nc3-e2 | Rc8-c6 |
| **16** | Be3-g5 | Qf6-e6 |
| **17** | Bg5xe7 | Qe6xe7 |
| **18** | Ne2-c3 | Bd7-e6 |
| **19** | Rf1-e1 | Qe7-c7 |
| **20** | Re1-e3 | Rf8-c8 |
| **21** | Re3-d3 | Rc8-d8 |
| **22** | ? | |



# Shops and software ready for Plus 3

THE Spectrum Plus 3, Amstrad's disc-based version of the five-year-old machine, now has a firm release date. Amstrad says it will be available from branches of Dixons from August 1.

During August, the machine will spread to more shops, and it should be widely available by September.

Of other major high street chain stores, Boots says it has agreed to sell the Plus 3 subject to the ratification of its merchandise technical approval department (a standard procedure).

However, WH Smith, normally a firm Spectrum supporter, is still undecided.

"We're thinking about it, but we're not stocking it immediately," said WHS's marketing development manager John Rowland.

WH Smith is concentrating on the Atari ST range and consoles – both the Sega and Atari 66XE – for its range this autumn.

Software houses, however, are viewing the Spectrum Plus 3 positively as its release date nears.

When the Plus 3 was announced, many said that they would wait to see what sales were like before considering adding disc-based Spectrum games to their catalogues. Now a number have decided to take the plunge. Most companies plan to gradually introduce their new games on both tape and disc to cater for Plus 3 buyers.

Tasman will be taking advantage of the opportunities for business use with a Plus 3 version of *Tasword,* due out in September.

*Tasword Plus 3* will incorporate a mailmerge facility and will integrate with Tasman's forthcoming spell checker.

An upgraded disc version of *Tasprint* is also in development, with 20 fonts (as opposed to its predecessor's five) and a font designer included.

Mastertronic has its eye firmly on compilations for the Plus 3. "We'll produce a reasonable range of disc software," affirmed Geoff Heath, although he doubted that with blank 3-inch discs currently costing around £1.60, that Mastertronic would be able to keep to its usual price points.

Ocean, which has enhanced six of its older titles to be bundled with the machine at launch, plans to start releasing further games for the Plus 3 in August.

"We've supported the 128K Spectrum quite strongly, so it's a natural progression to put the 128K games on disc," said Ocean's Gary Bracey. "We'll also offer our 48K titles on disc – and compilations are an obvious choice."

Domark says there will definitely be a Spectrum disc version of *The Living Daylights,* and it will probably release games on tape and disc, but has no plans to write games specifically for the disc version.

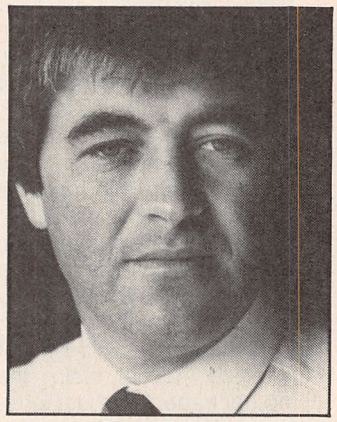
"We're sitting on the fence really," said Mark Strachan. "Bearing in mind the retail price of £250 – well, the ST is only £200 more and I think I know what people will do. Is it really worth it just to have a disc drive on the Spectrum?"

The Telecomsoft stable (Firebird, Rainbird and Beyond) is considering the prospect seriously, but with no firm plans as yet.

# PRICE CUTS HERALD NEW COMMODORE MD'S ARRIVAL

COMMODORE'S new UK managing director Steve Franklin has begun his 'development programme' at the company with further price cuts to Commodore's PC compatible range.

The twin floppy PC10 will now sell for £803.85 (inclusive) and the PC20, with a single floppy drive and 20Mb hard disc, is now £1,148.35.



**Steve Franklin**

Franklin has also appointed Jim Housego as national sales manager for Commodore UK. Housego previously held the same position at Granada Business Centres.

# Psygnosis disc exchange

LIVERPOOL-based company Psygnosis has discovered a loading problem with early release versions of *Barbarian,* its combat game.

The company is asking buyers of the Atari ST version who have been having loading problems to send the discs (not the packaging) back to Psygnosis to be exchanged. The address to send your faulty discs to is Psygnosis, FREEPOST, Liverpool L3 3AB.

Please note that this refers to *Barbarian* by Psygnosis, not *Barbarian* (different game) by Palace Software.

*See also this week's review of Psygnosis's* Barbarian.

# Taipan delayed in 'squeeze'

OCEAN'S flagship game for summer 1987, *Taipan,* is the latest of the company's titles to suffer delays.

Due for release at the end of May, *Taipan* will now be out "imminently" on Spectrum and Atari ST, according to the company's Gary Bracey.

"The Spectrum 128K version is finished, but we've had many problems cutting it down and compressing it to fit a 48K Spectrum," said Bracey.

"The Atari ST version is also complete now, and again there were difficulties squeezing it all into the available disc space."

# Archimedes plus software at Acorn show

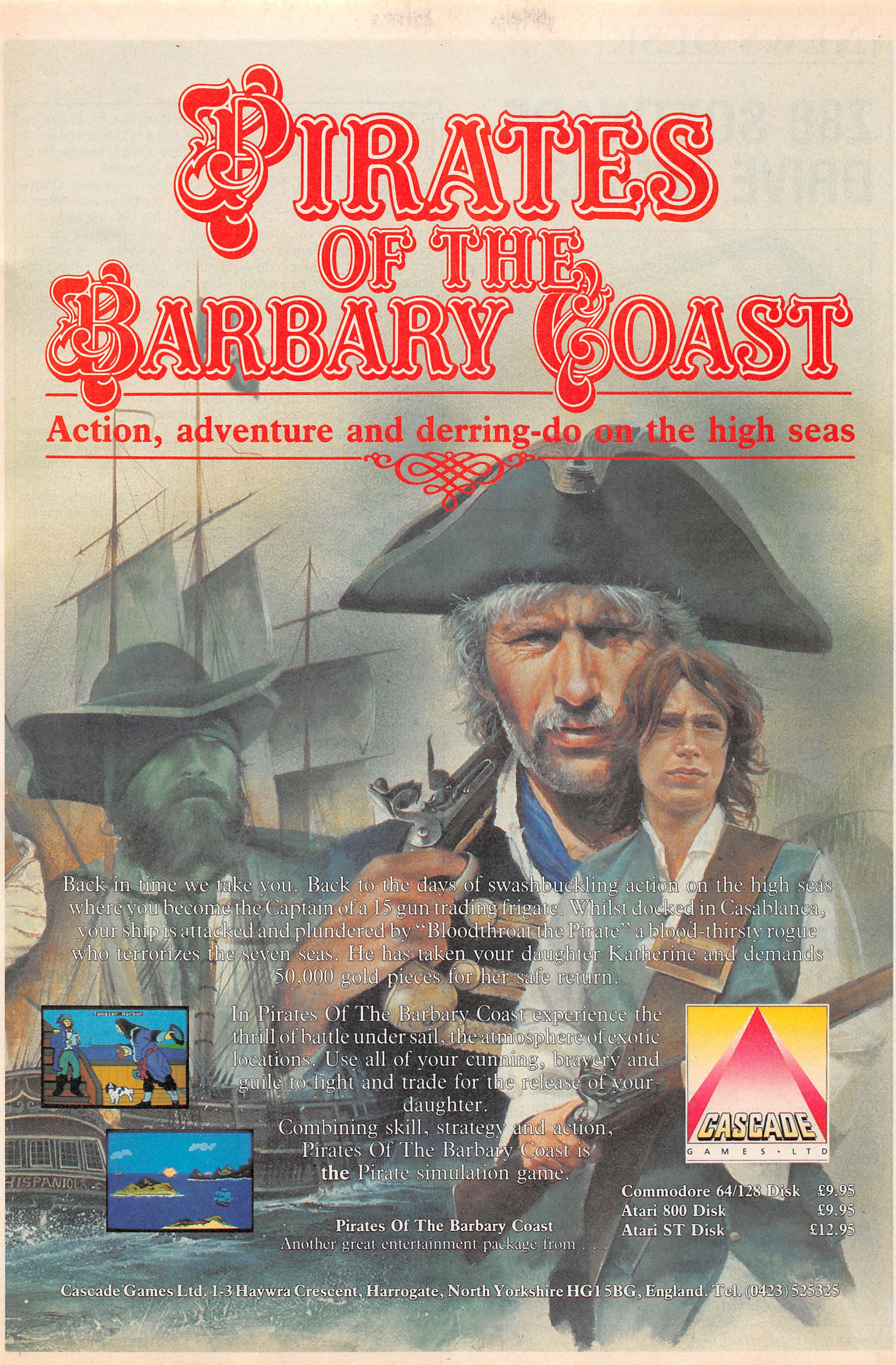
ACORN'S new RISC-based machine, the ARM or Archimedes (see *Popular Computing Weekly,* June 26), will form the centrepiece of the *Acorn User* exhibition, which opens on July 23 at the Barbican Exhibition Halls, London.

Minerva Systems, whose track record includes 'beginner' business programs for the Amstrad PCW machines, will be showing software for the Archimedes, including its first finished ARM product, *Deltabase,* a general purpose database.

The company also has a full database management system, *System DeltaPlus,* a programmable database, *Superdelta,* and an accounting suite in development for the Archimedes.

# Pirates of the Barbary Coast

## Action, adventure and derring-do on the high seas



Back in time we take you. Back to the days of swashbuckling action on the high seas where you become the Captain of a 15 gun trading frigate. Whilst docked in Casablanca, your ship is attacked and plundered by "Bloodthroat the Pirate" a blood-thirsty rogue who terrorizes the seven seas. He has taken your daughter Katherine and demands 50,000 gold pieces for her safe return.






In Pirates Of The Barbary Coast experience the thrill of battle under sail, the atmosphere of exotic locations. Use all of your cunning, bravery and guile to fight and trade for the release of your daughter.
Combining skill, strategy and action, Pirates Of The Barbary Coast is **the** Pirate simulation game.

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| | |
|---|---|
| Commodore 64/128 Disk | £9.95 |
| Atari 800 Disk | £9.95 |
| Atari ST Disk | £12.95 |

**Pirates Of The Barbary Coast**
Another great entertainment package from . . .

Cascade Games Ltd. 1-3 Haywra Crescent, Harrogate, North Yorkshire HG1 5BG, England. Tel. (0423) 525325

# Z88 SOFTWARE DRIVE BEGINS

CAMBRIDGE Computer has begun a drive to attract third party companies to produce software for its Z88 portable.

The Authorised Third Party Development Programme aims to give as much technical support as possible to interested companies, some of which have already begun development work. Space will be given to software companies on Cambridge Computer's stand at September's *PCW* show to display their programs for the machine.

Peter King, Cambridge Computer's marketing manager, said, "Comms will be big business on the machine, but we're also hoping people will publish software with vertical markets in mind, stock control software, that sort of thing.

"There has also been interest from companies in writing text adventures for the Z88, and things like chess and backgammon could also prove popular."

He added that the company would be actively looking at the OEM market (where other companies could customise Z88 machines for their own specific purposes) towards the end of the year, but that the priority now would be "to get it out to the retailers".

The Z88 is due to appear in the shops at the end of this month (see *Popular,* July 10), and Dixons and Comet will be two of the first chain stores to stock it, in early August.

# EOA donates prizes for Welsh Archon contest

THE *Archon* Knockout competition is being held in Cwmbran, Gwent, this summer to raise money for charity.

Computer shop The Soft Centre is staging the competition for the second year running, to raise money for the children's leukaemia and cancer charity, LATCH.

Last year's competition was a small event organised by Dale Bradford, one of the company's partners "because people kept coming into the shop and asking what my favourite game was. When I said *Archon,* nobody had heard of it, so I organised the competition and raised a bit of money."

This year, the competition is part of a series of summer events to be held in Cwmbran Town Centre, and Bradford expects it to be much larger. The entry fee is £1.50 and prizes are to be supplied by Electronic Arts, the publishers of *Archon.*

First prize is £100 worth of Electronic Arts' software, with £50 and £20 (to be spent on EOA titles) going to two runners' up.

The Soft Centre is at 30 The Parade, Cwmbran Town Centre, Gwent (06333 68131).

## SOFTWARE HOTLINES

Better be careful with what we say about **Virgin Games'** forthcoming *Rebel.* No sooner do we publish a review of its *Transatlantic Balloon Challenge,* than Richard Branson's balloon went and dropped straight into the ocean (this is what's known as the power of the press).

So all I'll say about *Rebel* is that it's a shoot 'em up set in a *Logan's Run* type scenario, in which the female hero attempts to escape from a state controlled farming compound in order to join the resistance on the 'outside'.

Virgin claims it's its best game since *Dan Dare* and we'll be reviewing it in the not-too-distant future.

We're also expecting to see the finished ST version of **Rainbird's** *Tracker* soon (pictured below). This strategy game has been 'completely rewritten' for 16-bit machines, and Rainbird says that it's a vast improvement over the C64 version, though you shouldn't be fooled into thinking that it's an arcade game just because of the combat sequence.

No animated combat at all in the new adventure from **Classic Quests.** We've already mentioned *Witch Hunt,* the first in their series of text-only adventures, but also in the pipeline are *Goblin Towers, Forest Land, Catacombs,* and the "absolutely massive" *Cornucopia.*

These will be available for most Commodore and Atari machines, and they might just sprout a few graphics when they're converted for the Amiga and ST.

Something else for adventure fantasy fans to look out for is the re-release of the *Ultima* series of role playing games.

Now that publisher **Origin** has got together with **Microprose** in the UK, the two companies have decided to re-release the games, complete with the original packaging (including cloth maps and fancy manuals) that were missing when US Gold was licensing the games. A chance to catch up if you missed them first time around.

At the risk of over exposure there's yet more news from **Mastertronic,** where I went to look over some of the games available for the **Sega games console** which Mastertronic is marketing.

Donning some trendy, dark, 3D glasses you can have a shot at *3D Gunner,* a simple space shoot 'em up that uses a light sensitive hand-held pistol which you aim at the TV screen.

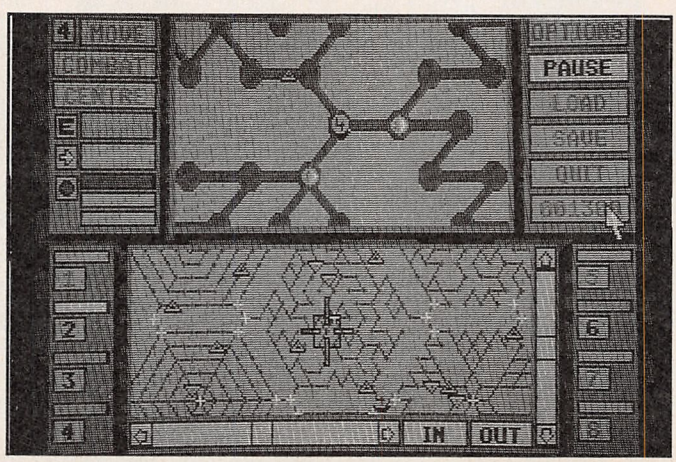
The prototype glasses certainly won't ever appear in Martini ads, but the final version of the glasses will, I'm told, look well crucial.

On to some of the other titles. The two-cartridge version of *Space Harrier* is excellent, and there are also a couple of games which haven't even been released in the arcades in England yet.

*Choplifter* is a 'copter versus jetplanes combat game, and *Alex Kidd in Miracle Land* is an incredibly cute platform game along the lines of *Super Mario Bros,* which is currently one of the big US coin-op hits.

The console itself is currently undergoing trials in a small number of Woolworth's stores, but should be widely available later in the year following launch at the *PCW* Show.

**Cliff Joseph**



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# NEXT WEEK

## Graphics

**In part three of our series on getting the most out of graphic packages, Paul McKinley explains how to use colour, fill patterns and airbrush options to get the effects you want.**

## Compunet

**Graham Edkins returns to keep you informed of the latest goings-on at Compunet, the network/database for Commodore owners.**

## Printers

**Panasonic's KXP-1081 costs around £200, but reviewer Joe McGonagle was impressed by the print quality of this dot matrix model.**

## Road Runner

**US Gold is heralding its *Road Runner* game as 'the licence of the year'. See for yourself how *Road Runner,* the cartoon, translates to *Road Runner,* the computer game.**

# Arnor releases 'compact' CP/M Protext

ARNOR'S *Protext* has now been released in a cut down version for those with fewer needs and smaller pockets.

Major differences are the omission of the mailmerge facilities and the spelling checker, which is good news for those who had already bought *Prospell* to work with *Locoscript* or *Tasword 8000.*

*Pocket Protext* is available for the Amstrad PCWs and CPC 6128 running under CP/M at £39.95.

Details from Arnor, Protext House, Wainman Road, Peterborough PE2 0BU.

# ST Art Studio advances

RAINBIRD Software extends its *Art Studio* series on to 16-bit machines with the release of *Advanced Art Studio* for the Atari ST this month.

Amongst the new features included in this version are a map creating facility and sprite animation routines which can be used in game design.

These graphics can then be output as standard Ascii files, allowing them to be used on other computers, and making quick games conversions possible for most home micros.

However, Rainbird has "no plans at the moment" to produce a version for the Amiga. *Advanced Art Studio* is due for mid-July release, priced at £24.95.

# Music 7000 confusion resolved

RECENT confusion over the naming of a number of BBC B music products has led to an agreement being reached between Hybrid Technology and Peartree.

Peartree's advertisements for the Music 7000 system led many BBC users to believe that this was a development of Hybrid's well-known Music 5000 synthesiser and Music 4000 keyboard. While based on the Music 5000 unit, the Peartree system has in fact not been developed by Hybrid's Chris Jordan, designer of the Music 5000.

Peartree has now agreed to change the name of its product to Music '87, while the '1000' designation remains reserved for Hybrid Technology products. Both companies will be showing products at the *Acorn User* show in July.

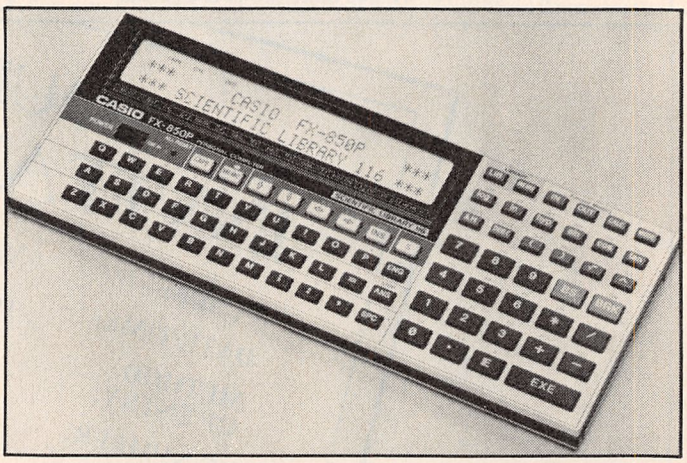
# New Casio calculator with printer option

CASIO'S latest pocket programmable calculator is the FX850P, with 8K Ram, inbuilt Basic language, and potential for data transfer through an RS232C interface.

The 8K Ram can be expanded to 16K or 40K, and the machine boasts 116 scientific functions in addition to the conventional calculator keys.

Optional extras include an incorporated Centronics and RS232C interface (£89.95), FP40 thermal printer (£141.90 including connector) and FP100 four colour printer/plotter (£279.95).

The FX850P itself costs £99.95. Details from Casio Electronics, Unit 6, 1000 North Circular Road, London NW2 7JD.




# DIARY DATES

## JULY

24–26 July
**Acorn User Exhibition**
Red Hall, Barbican Exhibition Hall, London
**Details:** Latest hardware and software plus seminars
**Price:** £2, advance, £3 on the door
**Organiser:** Redwood Publishing 01-836 2441

## SEPTEMBER

23–27 September
**Personal Computer World Show**
Olympia, London
**Details:** Latest hardware, software and peripherals for business and leisure computing
**Price:** £3, £2 – (parties over 10)
**Organiser:** Montbuild 01-486 1951

## OCTOBER

15–17 October
**Desktop Publishing Show**
Business Design Centre, London
**Details:** Demonstrations of latest hardware and peripherals, plus seminars and user clinics
**Price:** On application
**Organiser:** Database Exhibitions, 061-456 8383

23–25 October
**Amstrad Computer Show**
G-Mex, Manchester
**Details:** Displays and demonstrations of hardware, software and peripherals for all Amstrad computers
**Price:** £3 adult, £2 children, £1 discount if booked in advance
**Organiser:** Database Exhibitions, 061-456 8383

Prices, dates and venues of shows can vary, and you are therefore strongly advised to check with the show organiser before attending. *Popular Computing Weekly* cannot accept responsibility for any alterations to show arrangements made by the organiser.

# Atari 520STFM: price cut planned for September

THE Atari 520STFM, the version of the ST with a built-in floppy disc drive and TV modulator, will cost £299 (inclusive of VAT) from September 1, according to Paul Welch of Atari UK.

The price cut has been widely predicted since the machine's launch at £399 at the beginning of this year. The price cut leaves a question mark over the future of the 520STM, which is currently sold at £299, but does not have the built-in disc drive.

Atari's planned move puts pressure on Commodore to reduce the price of the Amiga 500 to a comparable level.

Welch reckons that with the price cut, Atari UK can now reappraise its sales targets for the STs this year, from 75,000 to 80,000 machines sold. It is thought that around 45,000 ST machines have been sold so far in the UK.

Welch added that Atari had now officially signed its deal with Dixons, adding the high street chain store to its list of dealers, and that Atari's STs would also now be available in Comet stores.

As for the fate of the up-market Mega STs, the first shipment is due "any day now". However, the accompanying laser printer has been delayed. It is now expected to be released in August, but Atari UK has still not made any decision about its price.

**Atari 520STFM – down to £299**

# Business booms at Amstrad Computer show

THE products on display at last week's Amstrad Computer show showed a heavy emphasis on utility, productivity and business packages. There was hardly a game in sight.

This sat well with Amstrad's display of its new PC1640 range, aimed at attracting the corporate buyer to Amstrad's PC alternative, on its stand.

At its new venue, Alexandra Pavilion, next to Ally Pally in north London, companies such as Digital Research, Migent and Micropro took large stands to exhibit their PC goods.

Despite the intense heat, sit-down demonstrations within Digital Research's stand and the Amstrad Theatre, set up for continuous seminars, were well-attended.

Electric Studio demonstrated its video digitiser, now available for PCs, at £129.95. The company also showed a PC light pen (£19.95) and Imprint, an image print out utility (£9.95).

Modem specialist Pace Micro Technology displayed its Linnet V21/V23 Hayes compatible intelligent modem.

New Star's stand emphasised the shift in attention from the PCWs to the PC machines with a number of new products for the PCs, including the expert system *VP Expert*.

The CPCs and PCWs, weren't entirely ignored, however. Notably, HiSoft, AMS and Arnor demonstrated their full range of products from the CPCs upwards. Software and add-on bargains for the CPCs were on show at many of the smaller stands.

# Silverstone competition results

OUR THANKS to all our Day Out at Silverstone competition entrants and also our apologies for the delay in announcing the winners – due to a postal strike in central London.

At least your entries reached us eventually. If you remember, we asked you, in *Popular Computing Weekly*, June 26, to answer three questions correctly to stand a chance.

The answer to the first question, "Which team won the 1987 Le Mans 24 hours race?" was the Rothmans/Porsche AG works team (we accepted Porsche as a correct answer).

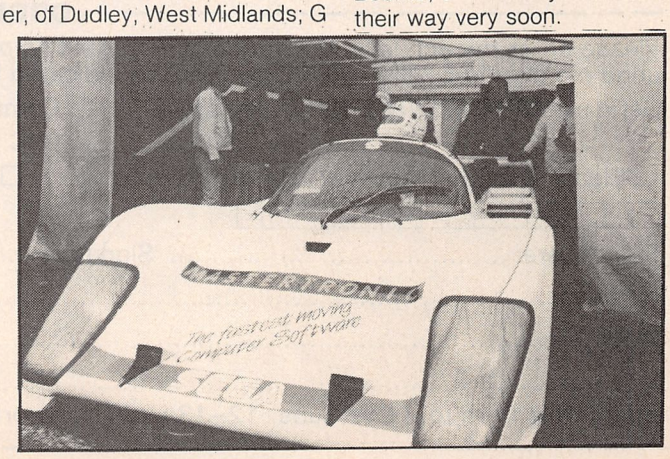
The driver on the winning team making his 17th competitive appearance (question two) at Le Mans was Derek Bell.

The Mastertronic racing game with sales of 500,000 (question three) was *Formula One Simulator*.

We were a bit lenient here, and accepted *Speed King* and *The Last V8* as being racing games with pretty respectable sales.

The three winners who get to go to Silverstone to see the Mastertronic-sponsored C sports car put through its paces are: Philip Burns, Witney, Oxon; David Cross, of Kidlington, Oxon; and Andrew Pennington, of Huyton, Merseyside.

The five runners-up who get the Mastertronic race team T-shirt are: Derek Wray, of Shildon, Co Durham; Richard Walker, of Dudley, West Midlands; G S Clarke, of Bristol; Mark Griffiths, of Merseyside; and J D Bourne, of Bletchley. T-shirts on their way very soon.



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## DI's Combat Pilot set for take-off

SIMULATIONS specialist Digital Integration has announced its plans for the rest of the year, with three new titles planned as well as an upgrade of *TT Racer* for the Atari ST.

The enhanced *TT Racer* is scheduled for an early September release to be followed in the autumn by *F-16 Combat Pilot,* a complex jet fighter combat simulation, and *Bobsleigh* – based on the "ever more popular winter sport".

DI will also be making a departure into arcade games with *ATF (Advanced Tactical Fighter),* a shoot 'em up in which you pilot a Lockheed YF22A across a 3D landscape.

Looking even further ahead, DI's Ilya Girson revealed plans to begin converting some of the company's ST titles for the Amiga, although this may not happen until next year.

"We like the Amiga," he said. "As long as the public like it. We think it will take off, but we're looking ahead to next year".

# NSPCC charity tape's contents finalised

FOLLOWING the success of 1985's *Soft Aid* cassette in aid of Ethiopian famine relief, and last year's *Off The Hook,* a consortium of software companies is planning to launch *BACK – Battle Against Cruelty to Kids* – at the *PCW* show.

*BACK* aims to raise funds for the NSPCC and RSSPCC (Royal Scottish Society for the Prevention of Cruelty to Children) campaign against child abuse.

It is hoped that *BACK* will raise £266,000 to set up a NSPCC/RSSPCC team of child protection officers.

These teams provide special services, such as a 24-hour telephone helpline, care for sexually abused children, and advice for the social services. The NSPCC/RSSPCC is currently setting up a network of such teams.

*Back Pack* is a compilation tape to be released on the three main formats, Spectrum, C64 and Amstrad CPCs.

All the proceeds are to go to the NSPCC/RSSPCC, and all the software houses involved have given their help free of charge to minimise costs.

Full details of the titles on each version of *BACK* are now available.

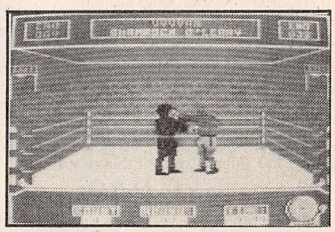
**Spectrum version:** *Xeno* (A'n'F), *Deactivators* (Ariolasoft), *Night Gunner* (Digital Integration), *Monty On The Run* (Gremlin), *Starion* (Melbourne House), *Mailstrom* (Ocean), *Starstrike* (Realtime), *Bounty Bob Strikes Back* (US Gold) and *Lunar Jetman* (Ultimate).

**Amstrad CPCs:** *Xeno Deactivators, Night Gunner, Monty On The Run, Starion, Starstrike, Tempest* (Electric Dreams), *Marsport* (Gargoyle), *Nomad* (Ocean), *Nightshade* (Ultimate).

**Commodore 64:** *Xeno, Deactivators, Monty On The Run, Starion, Bounty Bob Strikes Back, Barry McGuigan's Boxing* (Activision), *Bounces* (Beyond), *Spindizzy* (Electric Dreams), *Skyfox* (Electronic Arts), *Elektra Glide* (English).

The organisers are hoping to launch *Back Pack* in time for this year's *PCW* Show, priced at 'less than £10', but a charity auction has already raised £28,000 and a series of additional fund raising events are to be arranged during the autumn.

Further information can be obtained from Mal Thomas, for the organisers, on 0279 726585.

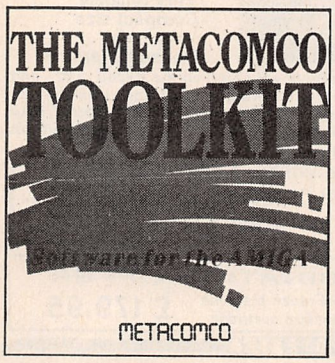


**Barry McGuigan – making a comeback**

## Metacomco upgrades Amiga Toolkit

METACOMCO'S updated version of its Amiga *Toolkit* set of utilities is now available.

Version 1.2 adds extra commands to the Amiga's operating system AmigaDos (also written by Metacomco), including a Unix-based Make utility and Touch utility.




*Metacomco Toolkit* costs £39.95. Details from the company at 26 Portland Square, Bristol BS2 8RZ.

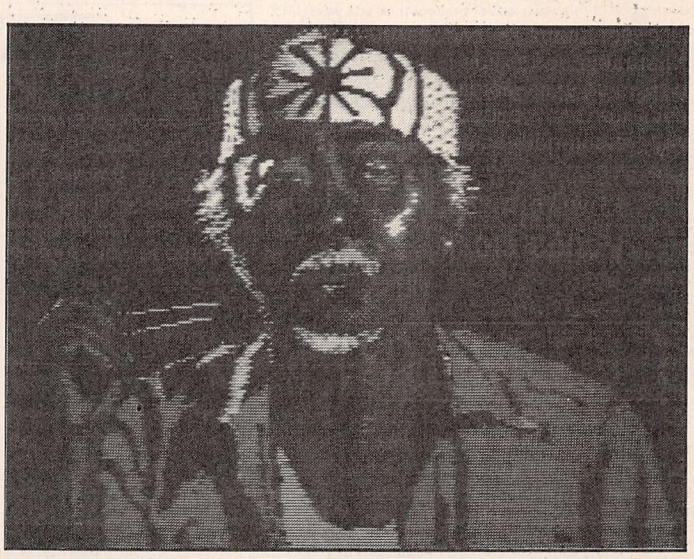
## Microdeal adds Amiga titles to games catalogue

ATARI ST specialist Microdeal has announced its intention to move into the Amiga market with the release of two new titles for the machine.

Priced at £24.95 and scheduled for release in early July, *Goldrunner* and *Karate Kid 2* are conversions of earlier ST titles, and a spokeswoman for the company said, "we're aiming to bring out all our best selling ST games for the Amiga eventually. It will be a gradual process."

However, the company will only be converting its range of games, and there are no plans to convert any of its applications or utilities packages.

Microdeal's next scheduled release is *Jupiter Probe,* by *Goldrunner* author Steve Bak, for the ST with Amiga version to follow soon after.



## Free play for Shadists

MICRONET members can take advantage of a current special offer of five hours free play on *Shades.*

*Shades* is a multi-user adventure/exploration game running on the Micronet database. The five free hours can be used up either as a single five-hour block or spread out over a number of units and personalities adopted by the player.

The offer is open to all Micronet members, whether experienced *Shades* players or not.

Details from Micronet at Durrant House, 8 Herbal Hill, London EC1R 5EJ (01-278 3143).

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# US Amateur Team Tournament

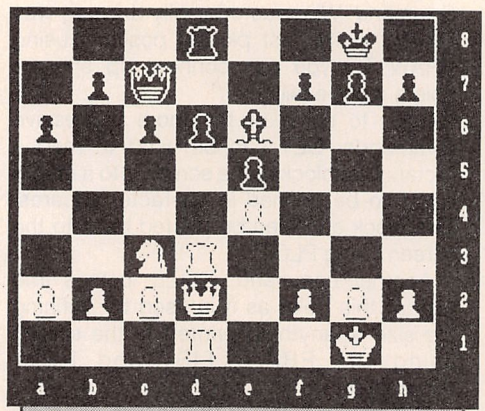
Computer chess is becoming a worldwide pastime, as evidenced by the US Amateur Team Championship held in Pasadena last February. Here, Martin Bryant offers his analysis of the results.

Recent advances in computer hardware architecture have resulted in yet another leap forward for microcomputer chess. Formerly stuck at about the Class A level (1800–2000 USCF, top club player) there is now strong evidence that some of the latest commercially available microcomputer chess machines are in the Expert category (2000–2200 USCF) and sometimes performing in the low Master range.

In February, the US Amateur Team Championship was held in Pasadena, California. This event had teams of four players in a six-round Swiss-style tournament. The chess machine manufacturer, Novag entered four of its machines. The Novag machines (all 6502 based) were Super Constellation (6MHz), Forte (5·5MHz), Expert (6MHz) and Turbo (16MHz bit-slice). Two of these machines, Super Constellation and Expert, are well known and have been publicly available for some time. The other two, Forte and Turbo, represent additions to the Novag product line.

The results from the tournament are very interesting. In the table below, the data represents the result of the outcome from the machines point of view and the opponents rating.

Note that Turbo was placed on board 2 rather than board 1 because it was an experimental machine with relatively little previous practical experience on which to judge its strength. Note also that Forte's result may be understated because of time control problems resulting from one person operating all four machines at once.



*The Readers v Colossus chess tournament is now well under way – but there is still time to enter. See page 5 for details of the game so far, how to join in and prizes to be won.*

Against master opponents, no points were scored, but only three such games were played, all by the Expert. Against expert opponents, in twelve games, a total of eight points were scored for a winning percentage of 67%. Against lower rated opponents, a total of ten games were played and six points scored for a winning percentage of 60%.

The most remarkable result of this tournament, of course, belongs to the Turbo an advanced bit-sliced processor design, now commercially available. Bit-slicing involves the redesign of single processors using multiple faster chips to achieve very high speeds. Turbo's six win, clean sweep against strong opposition is remarkable. This machine has also played a 10 game speed match against USCF Senior Master Jeremy Silman and won 7.5 to 2.5 against him!

In evaluating the Turbo's result and estimating its strength, it is important to realise that it is exactly four times as fast as the original 4MHz version of the Expert. Additionally, it searches about 3000–4000 positions per second. The author, Dave Kittinger, performed a test which showed that the Turbo searches the opening position of a chess game to a depth of six ply exactly four times as fast as the Expert at 4MHz, thus confirming the manufacturer's speed claims.

A rough rule of thumb used by computer chess researchers is that a machine gains about 100 ELO rating points for each doubling of speed. (This has been questioned, especially above 2000 points, with 80–90 points put forward as more accurate.) Since the Turbo is four times the speed of the Expert, one would expect a gain of 200 points, a full rating class.

The Expert is rated according to the reliable Swedish Rating List, at 1845 ELO (about 1945 USCF). Also the latest USCF rating of the Expert 6MHz is 2106. Since the Expert 4MHz is rated as a strong class A player, we can now calculate the estimated rating of the Turbo as one full class ahead of the Expert 4MHz. This would translate to a USCF rating of 2145, a strong candidate master, an excellent result for the Turbo. Dave Kittinger feels that the Turbo is a 'weak Master'. Additional tournament results will supply a more definite rating. However, at the very least, Turbo (along with the top of the line Mephisto 68020 machines) are the strongest commercially marketed machines ever.

*By Martin Bryant – author of CDS* Colossus 4 Chess.

| **Board Number** | 1 | | 2 | | 3 | | 4 | |
|---|---|---|---|---|---|---|---|---|
| | Expert | | Turbo | | Super-C | | Forte | |
| **Round No.** | | | | | | | | |
| 1 | 1 | 1615 | 1 | 1820 | 1 | 1850 | 0.5 | 1900 |
| 2 | 0 | 2396 | 1 | 2117 | 0 | 2089 | 1 | 2026 |
| 3 | 0 | 2369 | 1 | 2108 | 0.5 | 2103 | 0.5 | 2075 |
| 4 | 0 | 2217 | 1 | 2126 | 0 | 2105 | 0.5 | 2067 |
| 5 | 1 | 2115 | 1 | 1908 | 0.5 | 1789 | 0 | 1563 |
| 6 | 0.5 | 2071 | 1 | 2075 | 0 | 1996 | 0 | 1897 |
| **Total Score** | 2.5 | | 6 | | 2 | | 2.5 | |
| Average opponents' rating | | 2130 | | 2023 | | 1989 | | 1927 |
| Machine performance rating | | 2027 | | 2423 | | 1872 | | 1927 |

# Basically, it's Beta

The first version of *Beta Basic* appeared in 1985 to appease impatient Spectrum owners. Now – two years on – they're up to version 4. Duncan Evans finds out how much of it is really new.

Even the most fanatical Spectrum owner would have to concede that Spectrum Basic is not the most powerful implementation of the language. It's also ponderously slow. To rectify the situation, Beta Soft released *Beta Basic* in 1985 to favourable and well deserved reviews. Commands such as DO . . . LOOP, WHILE . . . WEND, REPEAT . . . UNTIL, and a pixel SCROLL were all well received.

Version 3.0 of the program had been the latest, but that only catered for 48K owners. Now, this new release, version 4.0, adds extra commands to exploit the potential of the Spectrum 128 and Plus 2.

Before we come to those though, a recoup on the main features of *Beta Basic,* and why Plus 2 owners should consider purchasing it.

## Structured Programming

Probably the biggest flaw with Spectrum Basic is its complete lack of structured programming commands. *Beta Basic* certainly endeavours to make up for this by providing procedures, local variables, DO . . . LOOP, EXIT IF, WHILE, UNTIL, IF . . . THEN . . . ELSE, ON X, and LIST FORMAT for indenting listings according to structure.

The interesting point about the DO command is that it can be used with WHILE and UNTIL to give DO UNTIL condition . . . LOOP, constructs.

The use of procedures has also been made more flexible. Not only could you have PROC dogfood (34) thus passing the value 34 to a variable in the procedure, as defined by DEF PROC dogfood (X), but with this version you don't have to use the PROC. The subroutine can be called with 'dogfood (34)' on its own.

## Graphics

Apart from CIRCLE, PLOT and DRAW, Spectrum Basic provides little for programmers looking for easy ways to draw objects. With *Beta Basic* you can do a lot more. ALTER a TO b works on the attribute file and will change all occurrences of colour a to colour b. You can determine whether the cplour of ink or the paper, or in fact both, is changed. ALTER also has another function, which isn't graphics related either, which enables you to replace one reference to another. The reference can be any sort of number, string or variable. Quite a powerful command, all told.

There is a new version of the DRAW command. Whereas originally drawing was relative to the last plotted position, using DRAW TO you can connect up specific points more easily.

Now, to some of the more impressive commands. GET can be used to read a rectangular block of the screen into a string; it has to be defined in character squares. This block can then be pasted back to the screen using PLOT.

Another command, CSIZE, comes into play at this point as it is used by defining the size of anything printed to the screen using the PRINT, LIST and PLOT commands.

Magnifying areas of the screen, juggling bits around, and shrinking them down again become very easy. If you want to go really over the top with CSIZE you can make one letter fill the entire screen.

Speaking of fills, there is, I'm glad to see, a fill command that will fill any enclosed area with a specified ink or paper colour. It's not that quick but then most fill routines aren't.

Want to write your own *Nemesis* clone? For that you'll need to scroll the screen. SCROLL does the job here – it can move part of or all of the screen on a pixel or character square basis. The attributes can be moved along as well with a little more effort.

ROLL is similar to SCROLL but has a wraparound effect so that anything disappearing off one end of the screen reappears on the other.

One of the problems with the old Spectrum SCREEN$ was that it wouldn't recognise user defined characters. SCRN$ takes care of that problem.

Windows can be useful, keeping graphics in one area, text in another. Adventure games, for example, are one application where this is used. Now you can have windows from Basic, 127 of them in fact. Each has its own attributes and cannot be affected by printing to any of the others. Three or four are usually all that is ever required so having 127 is a bit over the top to say the least.

Alas, there are no sprite commands in *Beta Basic,* something which would have been greatly appreciated.

## Sound

Now that the Spectrum 128K/Plus 2 has reasonable sound facilities though, Version 4.0 of *Beta Basic* does support sound commands. See further on for the details.

## Data Manipulation

Spectrum Basic isn't too bad in this department, but *Beta Basic* certainly improves on it. With JOIN and COPY you can slice and dice parts of, or all of, arrays, copying from one to another. LENGTH will inform you of not only an array's length but also its position in memory. DELETE can be used to remove part of the array if you want.

For use with database type applications, a fast SORT command, alphabetic or numeric, combined with INARRAY and INSTRING to search arrays and strings is of great value.

For manipulating pure blocks of data about the memory, you can call upon MEMORY$ which will read a specified area of memory into a string. You can then use POKE, which works with strings as well as numbers, to copy the block into another portion of memory entirely. Using this method you can have very fast memory block copying.

## Utilities

Utilities are the type of thing that eases the burden of programming, lessening the chances of pulling your hair out in frustration. I've already mentioned what ALTER can do, in its search and replace incarnation. Other useful commands include AUTO for automatic line numbering. RENUM for renumbering and also moving blocks of program lines and copying them.

Don't like one section of code? DELETE will see it off sharpish. There is a function for returning the amount of free memory, and many for listing the variables, user defined keys, procedures and lines in which a reference occurs.

For incorporating your own programming short cuts there are 36 user defined keys to make use of, with either strings or commands.

Okay, so that's what Version 3.0 of *Beta Basic* was capable of. Version 4.0 contains the same things but sports the following, Spectrum 128K specific, improvements.

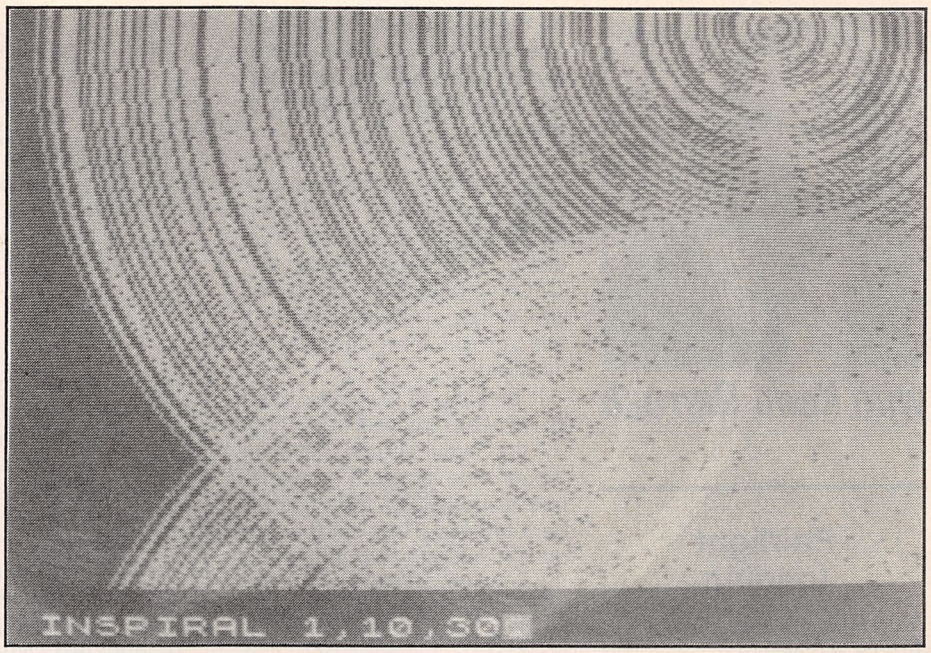
## What's New

The new commands cover sound, graphics and Ram disc functions. The full list is as follows. BEEP!, BEEP CLEAR, CAT!. CIRCLE, DELETE, DIM!, DRAW, ERASE, FILL USING, FORMAT, INPUT!, LIST!, PLAY, PLOT, SAVE!, SORT!, CAT$, FP$, INARRAY, MDP$ and NUMBER.

The problem with the ordinary BEEP and PLAY commands is that when they start the computer locks up until the notes have been finished. BEEP! alleviates this problem by being interrupt driven.

Although it shares the same name as the standard BEEP command the *Beta Basic* version has parameters for setting the tone period, duration, noise period, envelope, envelope period and volume. The associated command BEEP CLEAR, turns off the specified sound channel, and clears the associated sound queue.

Drawing circles was always one thing that seemed to take forever in Spectrum Basic so the provision of a circle command that does the task twelve times faster is certainly welcome. Drawing lines gets the speed treatment as well with the DRAW command.




Also in the graphics department is FILL USING which not only fills irregular shapes but allows you to define the fill pattern using a 16 pixel square grid. If you want to plot points on the bottom two lines of the display you now can with this new PLOT.

The Ram disc is a big feature of the 128K machines so what you need are a few more commands to make the most of it. CAT! lists all the files in the Ram disc and also gives the amount of free memory left, while CAT$ returns the catalogue as a string so that the information can be used from within a program.

**"Drawing circles seemed to take forever in Spectrum Basic so the provision of a circle command is certainly welcome"**

DIM! creates a Ram disc array, SORT! will sort the data contained in it, and INARRAY will search through it for a specified piece of data. The rest of the Ram disc commands deal with deleting, saving and loading programs or blocks of data.

That just about wraps up the additions to the command list, except for a couple of conversion functions and one to delete blocks of superfluous lines from your programs.

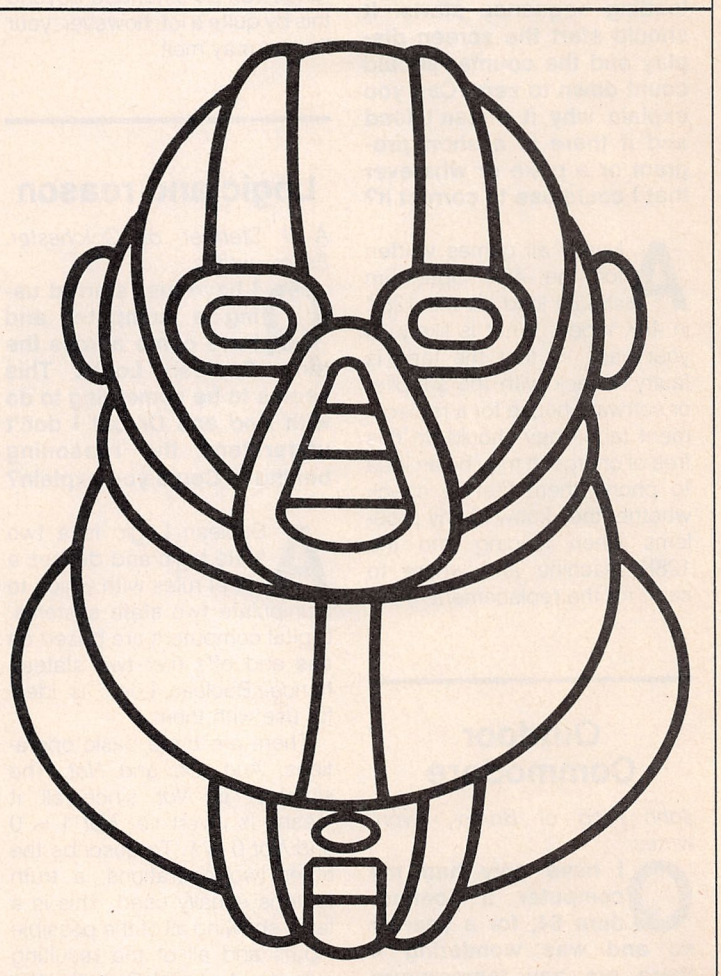
The actual *Beta Basic* (V4) package contains the manual for Version 3.0, a supplement dealing with Version 4.0 and a tape containing the program and also a turtle graphics utility. This demonstration consists of a large group of procedures written in *Beta Basic* which will draw shapes and patterns on the screen in response to direct commands, painfully slowly, mind you, in a similar fashion to the way Logo works. Although inspired by Logo, Turtle Graphics is not meant to be an implementation of that language, merely a demonstration of what you can do if you adopt a structured approach to programming with *Beta Basic*.

## Conclusion

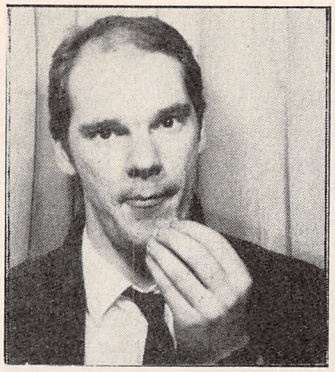
*Beta Basic* does have some rather good commands but isn't the definitive version of the language by any stretch of the imagination. Of course you can always wish for more power, and indeed sprite commands are one obvious area, but there are the limitations of the machine to bear in mind.

Still, for those Spectrum 128K owners who are disgruntled or disillusioned with the standard Basic, then *Beta Basic* surely represents an attractive alternative with its structured approach, powerful commands and low price.

**Product** *Beta Basic* **Micro** Spectrum 128/Plus 2 **Price** £15.95 **Supplier** Betasoft, 92 Oxford Road, Moseley, Birmingham B13 9SQ.



# PEEK & POKE



## with Kenn Garroch

## Fairlight loading

*T A Collins of Needham Market, Suffolk, writes:*

**Q My problem concerns loading a 48K game into a Spectrum 128K, in 48K mode. The game in question is *Fairlight 1* which loads normally until the black screen with *Fairlight Loading* and the number is displayed. It then ceases when the next loading sequence starts. It should start the screen display and the counter should count down to zero. Can you explain why it doesn't load and if there is a short program or a poke or whatever that I could use to correct it?**

A Nearly all games written for the 48K Spectrum should load on the 128K in 48K mode. What is likely, in your case, is that the tape is faulty. Check with the supplier or software house for a replacement tape, they should do this free of charge. It may be an idea to phone them first to check whether they know of any problems when loading into the 128K machine and where to send for the replacement.

## Outdoor Commodore

*John King of Bristol, Avon, writes:*

**Q I have only had my computer, a Commodore 64, for a year or so and was wondering if there are any temperature constraints on operating the machine. I know that this summer hasn't been very hot so far but I was thinking that, now that the weather is better, is there any problem using my machine outdoors in the sun?**

A Normal semiconductor chips have a rated operating temperature from about –10°C to 80°C maximum. 70°C is about the highest you should go, otherwise, some of the chips may begin to overheat.

In practice, chips have quite a lot of heat removed from them by the circuit board so even though the ambient temperature is about 70°C, the chips will be a bit less. The best thing to do is to keep the computer and the monitor in the shade and you should be alright. The main thing is to make sure that you don't get your equipment wet as this can do a lot more damage than high temperatures.

If you really want to have a high temperature machine, the best chips to use are military spec as these have an operating range from about –55°C to 125°C. Using heat sinks, the range can be extended beyond this by quite a lot; however, your fingers may melt.

## Logic and reason

*A J Starmer of Colchester, Essex, writes:*

**Q I have just started using a computer and have come across the term Boolean Logic. This seems to be something to do with *And* and *Or* but I don't understand the reasoning behind it. Could you explain?**

A Boolean Logic is a two state logic and defines a set of rules with which to manipulate two state systems. Digital computers are based on ons and offs (i.e. two states), hence. Boolean Logic is ideal for use with them.

There are three basic operations, *And, Or,* and *Not*. The simplest is *Not* since all it means is invert i.e. *Not* 1 is 0 and *Not* 0 is 1. To describe the other two operations, a truth table is usually used. This is a table showing all of the possible inputs and all of the resulting outputs. *And* and *Or* both take two inputs and provide one output. The truth table for *And* is:

| In1 | In2 | Out |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

With *And,* unless both of the inputs are 1, the result is 0. The *Or* truth table is:

| In1 | In2 | Out |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

In this case, unless both inputs are 0, the output is 1.

In a computer, the individual ons and offs (1s and 0s) are grouped into blocks of various sizes, 4 being a nibble, 8 a byte, 16 a word, and 32 a long word. Most home micros can operate on the groups from 4 to 16 with 8 being the most common.

To *And* two bytes together each bit is *And*ed with its corresponding bit to produce the result e.g.

```
00101101    In1 45
11101100    In2 236
00101100    Out 44
```

One of the uses for this operation is masking out bits that are not needed. For instance, to set the top 4 bits of a byte to 0 simply *And* with 15(00001111) since any 1 *And*ed with a 1 reproduces the 1, and zeros remain zero.

To set bits, the *Or* operation can be used i.e.

```
10010111
01000000
11010111
```

*Or*ed has set the 7th bit of the first byte to one.

In general, this is only used in machine code however, it is possible to use logic in Basic in this fashion e.g. to save space, store information as bits in a variable using *Or* and *And* to set them (to 1) and reset them (to 0) and also to test them i.e. 67 *And* 2 gives 2 denoting the second bit set.

The other use in high level languages such as Basic is with the *If* construction. Basic has true and false statements which are equivalent to on and off. Their numerical values depend upon the particular Basic but usually, true is –1 and false is 0. So, *Print 1=1* should give –1 or the computer's equivalent to true, and *Print 1=0* gives 0 or false. With *If,* the construction:

IF AGE<3 AND HEIGHT>2 THEN PRINT"Tall metric child"

Sometimes you should take care when mixing *And*s and *Or*s in an *If* statement as the interpreter can get confused. The best thing to do is bracket them just to make sure:

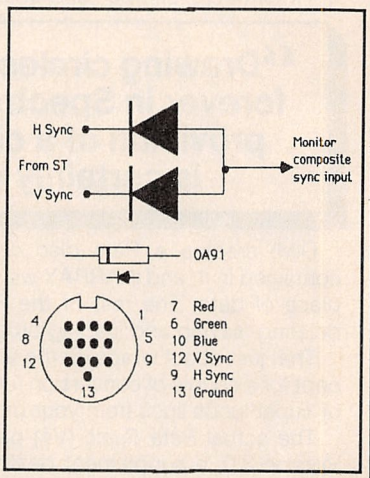
IF (AGE<3) AND (HEIGHT>2) THEN PRINT"Tall metric child"

Another way of using the logic in Basic is to use the fact that true is –1 and false is 0. The statement: X=X–(X<10) adds 1 to x only if X is less than 10 and is faster than IF X<10 THEN X=X+1 which is directly equivalent. The only trouble is that it can sometimes be hard to understand.

## The definitive monitor answer

I have, in the past, been asked about connecting RGB monitors to the Atari ST. Since the last time, I have found what seems to be the definitive answer.

The ST has two sync outputs, horizontal, and vertical. Most monitors have one sync input which requires both of these inputs. The problem is that if they are simply connected together, when one is low, it pulls the other down, and vice-versa. The answer is to use two diodes to mix the signals allowing one to be high while the other is low.




A diode is a semiconductor device that only conducts in one direction so by using the arrangement shown above, when one signal is opposite the other, they don't interfere. Using this with an Amstrad colour monitor gives a clear steady picture. Any general purpose diode will do, the OA91 from Maplin costs 10p so for minimal cost, the connection should be easy.

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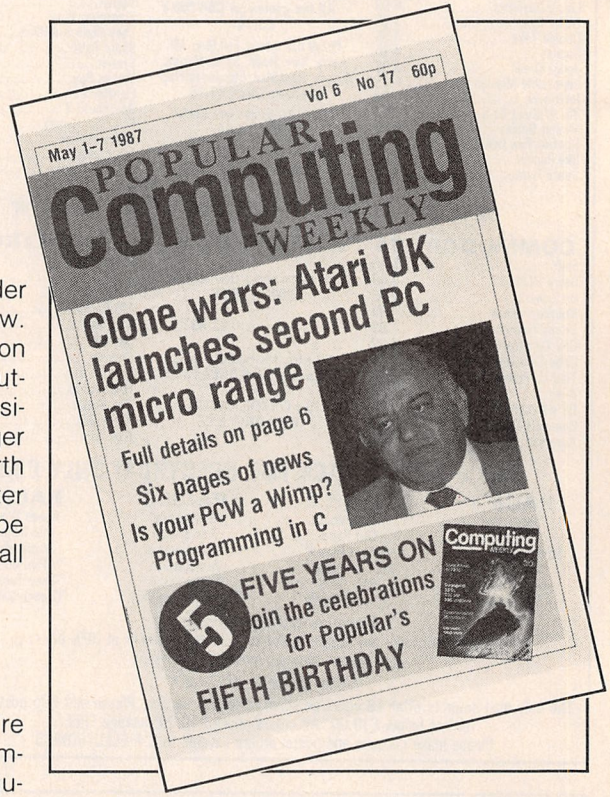


## Programs

Technical editor Duncan Evans relies on you for the programs section. It needn't be that machine code masterpiece that NASA was promising you vast sums for, what we're looking out for is handy routines, utilities, anything that you've concocted that makes your life easier as a programmer that you'd like to pass on to others.

Don't make your programs too long, please – it's best if we can print the full listing in one week, and a four part listing is probably the largest we can accept. If they're very short, then so much the better, they'll fit neatly into our Bytes and Pieces page.

## Features

We're also particularly interested in articles about programming, which should be sent to Christina Erskine. If you think you could explain technical areas of computing to a wider audience then do let us know.

We also welcome articles on any aspect of home computing, although we cannot feasibly accept anything longer than 2000 words. It's worth checking by phone or letter first that your piece will be suitable, but we're open to all ideas.

## Money no object?

If it's not the money you're interested in so much as simply having your say, the Ziggurat slot is where anyone can get up on a soap box and air their opinions. Your article should be 600–650 words long. We pay £15 per Ziggurat published.

For even less money, we'd like to hear your views, comments and opinions on our Letters page, and our columnists are always on the look-out for hints and tips and comments on their own areas of the magazine.

Mark Jenkins welcomes correspondence of a musical nature for Soundcheck, Martin Bryant is interested in any queries or views regarding computer chess, and our communications correspondents will be happy to answer questions about modems and networks (mark your envelope 'Comms').

Any technical or programming problems you're encountering can be addressed to Kenn Garroch. Kenn tries to help as many people as possible in Peek and Poke, but cannot undertake to give personal replies.

## How to submit

For features, it is almost always better if you write or telephone first to discuss your ideas with us. Your articles should be typed or word processed, preferably in double spacing, using one side of the paper only.

Please don't write more than 2000 words for an article. Program notes should explain what your program achieves and how it works, but, again, please keep them concise.

## Payment

Listings will be paid at a rate of £25 per published page, Bytes and Pieces at £10 each. For feature articles, we pay £40 per published page, which is about 800 words.

Your payment should arrive six weeks after publication date.

## Where to send them

All submissions should be sent to *Popular Computing Weekly*, 12–13 Little Newport Street, London WC2H 7PP. If you mark which department your letter is destined for on the envelope it will help us process them much more quickly.

We will make every attempt to acknowledge receipt of your submission.

# Graphics Extension

Gary Vine

Here's the concluding part of Gary Vine's program. The drawing commands are the same as normal except that they obey the *Mask* command (*Mask 255,1* is the standard full line) and have an optional fourth parameter where a value of 0 is overwrite, 1 is *XOR* mode, 2 is *AND* mode and 3 is *OR* mode.

The remaining four commands are as follows.

*:VDU x,x . . .* which effects the same as Print Chr$(x) . . .

*:Store x$* where *x$* follows this format. *Store "C0000:FFEDF7"* would *Poke &C000,&FF:Poke &C001:Poke &C002,&F7.* The address must be four characters long although the rest of the string can be up to 255.

*:Repeat* and *:Until condition,* which performs a loop until the condition is satisfied.

If you want a copy on cassette send £3.00, or £5.00 for disc, to 157a High Hill Road, New Mills, Stockport, Cheshire SK12 4HQ. Also sent will be a MAXAM source code for the program.

```
206 DATA BD,CD,09,BB,38,FB,C9,CD,1303
207 DATA 89,94,CD,E4,BB,C3,61,94,1345
208 DATA CD,89,94,CD,DE,BB,C3,61,1396
209 DATA 94,CD,51,94,CD,91,CE,7A,1260
210 DATA FE,00,20,B1,7B,FE,10,30,904
211 DATA AC,C9,CD,91,CE,43,CD,55,1286
212 DATA DD,D2,45,94,CD,91,CE,C9,1405
213 DATA CD,51,94,CD,9A,94,78,A7,1228
214 DATA F5,C4,7B,BB,F1,CC,7E,BB,1509
215 DATA 7B,A7,C4,B1,BB,CC,B4,BB,1325
216 DATA CD,61,94,C9,CD,51,94,CD,1290
217 DATA 9A,94,78,FE,FF,28,0B,A7,1149
218 DATA 28,08,7B,A7,78,28,0C,0F,525
219 DATA 30,FD,CB,07,32,23,91,CD,946
220 DATA 61,94,C9,0F,38,FD,18,F2,1036
221 DATA CD,1A,95,CD,C0,BB,18,26,1026
222 DATA CD,1A,95,CD,C3,BB,18,1E,1021
223 DATA CD,1A,95,CD,F6,BB,18,16,1064
224 DATA CD,1A,95,CD,F9,BB,18,0E,1059
225 DATA CD,1A,95,CD,EA,BB,18,06,1036
226 DATA CD,1A,95,CD,ED,BB,CD,5E,1308
227 DATA 94,C9,CD,4E,94,01,66,95,1032
228 DATA ED,43,E9,BD,21,B8,95,22,1126
229 DATA 0F,BC,3E,C3,32,0E,BC,CD,917
230 DATA 11,BC,32,24,91,CD,5E,94,883
231 DATA CD,91,CE,D5,CD,55,DD,D2,1490
232 DATA 45,94,CD,91,CE,D5,CD,55,1276
233 DATA DD,30,15,CD,91,CE,7B,CD,1174
234 DATA DE,BB,CD,55,DD,30,09,CD,1182
235 DATA 91,CE,7B,E5,CD,59,BC,E1,1410
236 DATA 22,00,90,E1,D1,C9,C5,D5,1223
237 DATA E5,21,23,91,79,A7,28,1D,799
238 DATA 3A,24,91,3D,28,1E,3D,28,471
239 DATA 2E,79,FE,03,28,07,CB,0E,688
240 DATA 38,0B,AF,18,0B,7E,E6,03,633
241 DATA CB,0E,CB,0E,A1,E1,D1,C1,1222
242 DATA 4F,C3,68,0C,79,06,04,0F,536
243 DATA DC,9F,95,10,FA,18,EE,CB,1259
244 DATA 0E,D8,CB,9F,CB,BF,C9,79,1308
245 DATA 06,08,0F,DC,B2,95,10,FA,842
246 DATA 18,DB,CB,0E,D8,CB,BF,C9,1271
247 DATA 32,24,91,CF,CA,BA,CD,51,1064
248 DATA 94,CD,91,CE,7A,FE,00,C4,1276
249 DATA 5A,BB,7B,CD,5A,BB,CD,55,1172
250 DATA DD,38,EE,CD,61,94,C9,CD,1371
251 DATA 51,94,CD,9F,CE,22,00,90,977
252 DATA CD,23,96,1A,FE,3A,C2,45,991
253 DATA 94,13,05,CA,45,94,E5,DD,1041
254 DATA E1,CD,16,96,DD,77,00,DD,1163
255 DATA 23,78,FE,00,20,F3,CD,5E,983
256 DATA 94,C9,78,FE,00,CA,45,94,1142
257 DATA 1A,CB,AF,FE,41,38,02,D6,995
258 DATA 27,D6,10,13,05,C9,CD,02,701
259 DATA 96,07,07,07,07,4F,CD,02,464
260 DATA 96,B1,C9,CD,16,96,67,CD,1213
261 DATA 16,96,6F,C9,CD,4E,94,3A,973
262 DATA 0F,90,FE,78,38,05,1E,21,657
263 DATA C3,94,CA,06,01,7E,23,FE,967
264 DATA DD,28,1A,FE,00,20,F6,7E,945
265 DATA FE,00,20,F1,23,7E,FE,00,942
266 DATA 20,EB,23,7E,FE,00,20,E5,943
267 DATA 1E,22,C3,94,CA,7E,FE,8F,1132
268 DATA 28,07,FE,8E,20,D7,04,18,718
269 DATA D4,05,78,FE,00,20,CE,3A,887
270 DATA 0F,90,2A,00,90,11,0F,90,521
271 DATA 3C,47,13,13,10,FC,EB,73,787
272 DATA 23,72,EB,32,0F,90,CD,5E,892
273 DATA 94,C9,3A,0F,90,FE,00,20,852
274 DATA 05,1E,20,C3,94,CA,CD,51,898
275 DATA 94,CD,91,CE,7A,B3,20,14,1057
276 DATA 3A,0F,90,11,0F,90,47,13,483
277 DATA 13,10,FC,EB,5E,23,56,EB,972
278 DATA CD,61,94,C9,3A,0F,90,3D,929
279 DATA 32,0F,90,18,F3,0F,90,3C,695
280 DATA 47,13,13,10,FC,EB,73,23,762
281 DATA 72,EB,32,0F,90,CD,A5,94,1076
282 DATA C9,3A,0F,90,FE,00,20,05,709
283 DATA 1E,20,C3,94,CA,CD,98,94,1112
284 DATA CD,91,CE,7A,B3,20,14,3A,967
285 DATA 0F,90,11,0F,90,47,13,13,444
286 DATA 10,FC,EB,5E,23,56,EB,CD,1158
287 DATA A8,94,C9,3A,0F,90,3D,32,845
288 DATA 0F,90,18,F3,0D,ED,78,17,819
289 DATA 30,FB,0C,C9,01,7E,FA,3E,951
290 DATA 01,ED,79,21,FF,FF,06,01,909
291 DATA 10,FE,2B,7C,B5,20,F7,C9,1098
292 DATA CD,95,94,CD,2A,97,CD,A5,1270
293 DATA 94,C9,F3,01,7F,FB,CD,04,1180
294 DATA 97,3E,03,ED,79,CD,04,97,934
295 DATA 3E,C2,ED,79,CD,04,97,3E,1036
296 DATA 09,ED,79,3E,FF,32,A8,AB,1070
297 DATA 3E,F0,32,99,A8,3E,7F,32,912
298 DATA 97,A8,3E,C3,32,9B,BC,21,1002
299 DATA F4,97,22,9C,BC,21,28,91,991
300 DATA CD,D4,BC,22,25,91,79,32,992
301 DATA 27,91,FB,C9,CD,98,94,CD,1346
302 DATA 9F,CE,22,00,90,ED,53,0A,873
303 DATA 90,32,0E,90,FE,0B,20,1C,674
304 DATA 3A,25,91,FE,00,20,05,1E,561
305 DATA 23,C3,94,CA,21,30,A9,3A,888
306 DATA 00,A7,5F,16,00,0E,C1,DF,714
307 DATA 25,91,38,05,1E,24,C3,94,652
308 DATA CA,DD,21,30,A9,0E,10,DD,924
309 DATA 7E,09,FE,44,20,39,DD,7E,893
310 DATA 0A,FE,49,20,32,DD,7E,0B,777
311 DATA FE,52,20,2B,ED,5B,0A,90,893
312 DATA 06,07,DD,E5,E1,23,23,1A,784
313 DATA BE,20,1C,23,13,10,F8,DD,789
314 DATA 02,0E,32,01,A7,06,07,21,280
315 DATA 29,91,DD,7E,02,77,23,DD,910
316 DATA 23,10,F7,CD,A5,94,C9,0D,1030
317 DATA AF,B9,28,B0,06,20,DD,23,870
318 DATA 10,FC,18,B3,0E,07,CD,0F,712
319 DATA B9,ED,43,0C,90,FD,2A,7D,1065
320 DATA BE,21,58,98,E3,22,08,90,876
321 DATA CD,73,CD,D5,DD,E1,01,00,1185
322 DATA 08,CD,AF,CA,CD,86,DA,CD,1352
323 DATA 14,CE,D5,F5,11,44,98,CD,1126
324 DATA 4E,98,F1,F5,C6,41,CD,5A,1274
325 DATA BB,11,4B,98,CD,4E,98,C5,1063
326 DATA 11,29,91,06,07,1A,FE,20,528
327 DATA C4,5A,BB,13,10,F7,C1,F1,1189
328 DATA D1,C3,28,D5,44,72,69,76,1062
329 DATA 65,20,FF,3A,20,FF,1A,FE,1013
330 DATA FF,C8,CD,5A,BB,13,18,F6,1226
331 DATA ED,4B,0C,90,CD,18,B9,2A,924
332 DATA 08,90,E5,C9,00,00,00,00,582
333 DATA 00,00,00,00,00,00,00,00,0
334 DATA 3E,C3,32,04,AC,32,07,AC,712
335 DATA 32,10,AC,32,16,AC,32,19,557
336 DATA AC,21,8B,92,22,05,AC,21,734
337 DATA 06,94,22,08,AC,21,D5,92,760
338 DATA 22,11,AC,21,4D,93,22,17,537
339 DATA AC,21,C2,93,22,1A,AC,C9,979
```

# A Game of Two Halves

Andrew Oldacre

Due to legal reasons Soccer Boss is being called A Game of Two Halves from now on. It shouldn't affect your enjoyment of the game though.

Once a match has been played, sit back and wait for the weeks results. When you've examined these you go onto the transfer market. You will be offered a player and a suggested price. On the higher skill levels it's worth bidding high to get a player you especially want.

After you've had the chance to unload a deadbeat player your finances are shown along with an opportunity to get a loan from the bank. More details in the final instalment next week.

```
Who is worth #";j(n)*INT (1000/dv)''AT 1
3,3;"Do you accept (y/n)": INPUT l$(1)
2541 IF b$(x)=t$(9) THEN  LET b$(x)=t$(l
1)
2542 IF b$(x)=t$(10) THEN  LET b$(x)=t$(
12)
2543 IF c$(x)=t$(11) THEN  LET c$(x)=t$(
9)
2544 IF c$(x)=t$(12) THEN  LET c$(x)=t$(
10)
2545 IF c$(x)=t$(13) THEN  LET c$(x)=t$(
15)
2546 IF c$(x)=t$(14) THEN  LET c$(x)=t$(
16)
2547 IF d$(x)=t$(15) THEN  LET d$(x)=t$(
13)
2548 IF d$(x)=t$(16) THEN  LET d$(x)=t$(
14)
2550 NEXT x
2570 FOR x=1 TO 15
2580 IF j(x)>0 THEN  LET j(x)=INT (RND*1
0)+1
2590 LET g(x)=0
2591 NEXT x
2600 CLS
2605 LET con=con-1
2606 IF con=0 THEN  GO TO 2610
2607 PRINT  INK 1; PAPER 5;AT 0,10;"Mana
gers Contract": PRINT  PAPER 7; INK 2;AT
 3,10;"Club ";y$''AT 5,10;"Seasons left
";con: PRINT  INK 4; PAPER 6; FLASH 1;AT
 9,10;"Press any key": PAUSE 0: GO TO 26
40
2610 PRINT  PAPER 2; INK 7; FLASH 1;AT 0
,10;"New Club?"
2611 LET clb=INT (RND*48)+1: LET fff=INT
 (RND*5)+1
2612 IF cid=1 THEN  LET l$(1)="y ": GO T
O 2630
2620 PRINT  PAPER 1; INK 7;AT 9,9;v$(clb
)''AT 11,3; INK 7; PAPER 4;"would like y
ou as manager": PRINT AT 13,1;"On a ";ff
f;" year Contract (y/n)": INPUT l$(1)
2630 IF l$(1)="y " THEN  LET y$=v$(clb):
 LET mon=70000: LET con=fff: GO TO 2640
2631 CLS : PRINT  INK 2; PAPER 6; FLASH
1;AT 0,10;"*New Contract*"
2632 LET con=INT (RND*5)+1
2633 PRINT  PAPER 7; INK 1;AT 10,1;"You
have signed a new contract
                  with ";y$
2634 PRINT  INK 2;AT 14,1;"The contract
is for ";con;" years"
2635 PRINT  PAPER 0; INK 7;AT 16,1;"Pres
s any key to continue...": PAUSE 0
2640 INPUT " Change Manager Skill Level"
;l$(16)
2642 IF l$(16)<>"y " THEN  GO TO 2647
2643 INPUT " Enter new skill level 1-4";
l$(16): LET n=VAL l$(16): IF n<1 OR n>4
THEN  GO TO 2643
2644 LET ski=n
2647 IF y$=t$(3) THEN  LET euro=1: LET c
pin=1
2648 IF y$=t$(4) THEN  LET euro=1: LET l
gin=1
2649 FOR x=1 TO 12
2650 IF a$(x)=y$ THEN  LET dv=1
2651 IF b$(x)=y$ THEN  LET dv=2
2652 IF c$(x)=y$ THEN  LET dv=3
2653 IF d$(x)=y$ THEN  LET dv=4
2669 NEXT x
2679 PRINT : PRINT  INK 0;"        SAVE
GAME? (y/n)": INPUT l$(1)
2680 IF l$(1)="y " THEN  GO TO 2690
2685 GO TO 290
2690 SAVE "SoccerBoss" LINE 290
2700 CLS : PRINT  INK 9;AT 10,10;"Contin
ue (y/n)": INPUT l$(1)
2710 IF l$(1)="y " THEN  GO TO 290
2720 NEW
2800 SAVE "SoccerBoss" LINE 0
2810 GO TO 2700
2900 SAVE "SoccerBoss" LINE 401
2910 GO TO 2700
3000 LET apr=INT (RND*12)+8
3010 CLS : PRINT  PAPER 2; INK 7;AT 0,5;
"Spectrum Bank Plc"
3020 PRINT  INVERSE 1;AT 5,5;"Base Rate
";apr;"%"
3030 PRINT  INK 1;AT 8,5;"Loan required
?": INPUT p$(41): LET n=VAL p$(41)
3040 IF dv=1 THEN  LET credit=60000
3050 IF dv=2 THEN  LET credit=40000
3051 IF dv=3 THEN  LET credit=25000
3052 IF dv=4 THEN  LET credit=15000
3053 IF n>credit THEN  PRINT : PRINT "
   Credit limit #";credit: BEEP .1,2: PA
USE 100: GO TO 3000
3054 IF n<=100 THEN  RETURN
3055 LET int=(n/100)*apr: LET int=INT in
t
3056 LET loan=n+int
3057 PRINT : PRINT  INK 2;"     Loan agr
eed #";n
3058 PRINT : PRINT  INK 2;"     Total ba
lance #";loan
3059 LET mon=mon+n
3060 BEEP .2,3: PRINT : PRINT "     Pres
s any key": PAUSE 0: RETURN
3100 CLS : PRINT  INK 7; PAPER 1;AT 0,10
;"Paying off loan"
3110 PRINT  INK 2; INVERSE 1;AT 5,10;"Ba
lance #";loan
3120 PRINT  INK 1;AT 8,10;"How much to p
ay?": INPUT p$(41)
3130 LET n=VAL p$(41)
3140 IF n<1 OR n>loan THEN  GO TO 3100
3150 LET loan=loan-n: PRINT AT 11,10; IN
K 1; INVERSE 1;"New balance #";loan
3151 LET nn=n
3160 IF loan=0 THEN  PRINT  INK 4; INVER
SE 1;AT 14,10;"Loan totally cleared": BE
EP .04,4: BEEP .3,2: PAUSE 100: RETURN
3170 BEEP .3,4: PAUSE 100: RETURN
3200 IF euro=0 THEN  RETURN
3210 IF leg=0 THEN  LET round=round+1
3211 LET mon=mon+10000
3220 BORDER 4: PAPER 4: CLS
3221 IF lgin=1 THEN  GO TO 3231
3230 IF cpin=1 OR ecp=1 THEN  PRINT  PAP
ER 2; INK 7;AT 0,6;"European Cup Winners
 Cup"
3231 IF lgin=1 OR elg=1 THEN  PRINT  PAP
ER 2; INK 7;AT 0,6;"European Champions C
up"
3240 LET leg=leg+1: IF leg=2 THEN  GO TO
 3250
3241 LET tem=INT (RND*12)+1: LET tem=tem
+48
3242 IF i$(tem)="o" THEN  GO TO 3241
3243 LET m$=v$(tem): LET i$(tem)="o"
3244 LET firstlh=0: LET firstla=0: LET f
ixture=INT (RND*2): LET agh=0: LET aga=0
3245 GO TO 3260
3250 LET seclh=0: LET secla=0: LET tfixt
=fixture: LET m$=v$(tem)
3251 IF tfixt=1 THEN  LET fixture=0: GO
TO 3260
3252 LET fixture=1
3260  IF round=1 THEN  PRINT  PAPER 2; I
NK 7;AT 2,10;"Round 1 Leg ";leg
3261  IF round=2 THEN  PRINT  PAPER 2; I
NK 7;AT 2,10;"Round 2 Leg ";leg
3262  IF round=3 THEN  PRINT  PAPER 2; I
NK 7;AT 2,8;"Quarter Final Leg ";leg
3263  IF round=4 THEN  PRINT  PAPER 2; I
NK 7;AT 2,8;"Semi Final Leg ";leg
```

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```
3264  IF round=5 THEN  PRINT  PAPER 2; I
NK 7;AT 2,8;"The Cup Final Leg ";leg
3265 LET aas=0: LET hhs=0: LET ti=0: LET
 ps=7: PAUSE 100: BEEP .2,2
3266 IF fixture=1 THEN  PRINT  PAPER 6;
INK 1;AT 4,10;m$;" ";aas: PRINT  PAPER 6
; INK 1;AT 5,10;y$;" ";hhs
3267 IF fixture=0 THEN  PRINT  PAPER 6;
INK 1;AT 4,10;y$;" ";hhs: PRINT  PAPER 6
; INK 1;AT 5,10;m$;" ";aas
3268 PAUSE 10: PRINT  PAPER 1; INK 7;AT
20,12;"*Time ";ti;"*"
3277 LET rd=INT (RND*189)+1
3280 IF rd=123 OR rd=34 OR rd=66 THEN  G
O TO 3300
3281 IF rd=59 THEN  GO TO 3300
3290 IF rd=11 OR rd=56 OR rd=129 THEN  G
O TO 3310
3291 BEEP .03,1: LET ti=ti+1
3292 IF ti=46 THEN  BEEP .2,3: PRINT  IN
K 0;AT 21,10;"Half Time ";hhs;"-";aas: G
O TO 3266
3293 IF ti=91 THEN  BEEP .2,3: PRINT  IN
K 0;AT 21,10; INVERSE 1;"Full Time ";hhs
;"-";aas: PAUSE 200: GO TO 3400
3294 GO TO 3266
3300 LET rrd=INT (RND*10): IF rrd=3 OR r
rd=6 AND fixture=1 THEN  GO TO 3266
3301 FOR x=1 TO 10: BEEP .01,x: NEXT x
3302 LET scr=INT (RND*15)+1: IF k$(scr)<
>"p" THEN  GO TO 3302
3303 LET pen=INT (RND*10)
3304 IF pen=2 THEN  PRINT  INK 1; BRIGHT
 1;AT ps,8;s$(scr);"(Pen) ";ti;" Mins"
3305 IF pen<>2 THEN  PRINT  INK 1; BRIGH
T 1;AT ps,8;s$(scr);ti;" Mins"
3306 LET ps=ps+1: LET g(scr)=g(scr)+1
3307 LET hhs=hhs+1: IF fixture=1 THEN  L
ET agh=agh+1: GO TO 3266
3308 GO TO 3266
3310 LET rrd=INT (RND*10)
3320 IF rrd=3 OR rrd=6 AND fixture=0 THE
N  GO TO 3266
3321 IF fixture=0 THEN  LET aga=aga+1
3330 FOR x=1 TO 10: BEEP .03,x: NEXT x:
LET aas=aas+1: GO TO 3266
3400 IF leg=1 THEN  LET firstlh=hhs: LET
 firstla=aas
3410 IF leg=2 THEN  LET seclh=hhs: LET s
ecla=aas: LET leg=0
3420 IF leg=1 THEN  PAUSE 200: RETURN
3430 LET toth=firstlh+seclh: LET tota=fi
rstla+secla
3431 PRINT  INK 7; PAPER 1;AT 13,1;"Agrr
:";y$;toth;" ";m$;tota: PAUSE 100: BEEP
.1,2
3440 IF toth>tota AND round=4 THEN  CLS
: FOR x=1 TO 20: BEEP .04,x: PRINT  INK
7; PAPER 1;AT x,2;"You're through to the
 final!": PAUSE 200
3450 IF toth>tota AND round<4 THEN  PRIN
T  PAPER 1; INK 7;AT 18,2;"You're throug
h to round ";round+1: BEEP .3,2: BEEP .0
4,5: PAUSE 200
3451 IF toth>tota AND round=5 THEN  GO T
O 3502
3460 IF tota>toth THEN  BEEP .1,6: LET e
uro=0: PRINT  PAPER 1; INK 7;AT 18,2;"Yo
u're out of Europe for now!": PAUSE 200
3468 IF toth<>tota THEN  GO TO 3500
3469 IF toth=tota AND agh=aga THEN  GO T
O 3472
3470 IF toth=tota AND agh>aga THEN  BEEP
 .03,3: PRINT AT 18,1;"You won on away g
oals!!!": PAUSE 200: IF round=5 THEN  GO
 TO 3501
3471 IF toth=tota AND agh<aga THEN  BEEP
 .03,3: PRINT  PAPER 1; INK 7;AT 18,1;"Y
ou are out on away goals!!": LET euro=0:
 PAUSE 200: GO TO 3500
3472 IF toth=tota AND aga=agh THEN  LET
rrd=INT (RND*2)
3473  IF rrd=1 THEN  PRINT  PAPER 1; INK
 7;AT 18,1;"You won on penalty Kicks!!!!
!": BEEP .4,2: PAUSE 200: IF round=5 THE
N  GO TO 3501
3474  IF rrd=0 THEN  PRINT  PAPER 1; INK
 7;AT 18,1;"You are out on penalty Kicks
!": BEEP .3,2: PAUSE 200: LET euro=0
3500 LET leg=0: LET aga=0: LET agh=0
3501 RETURN
3502 CLS : FOR x=1 TO 20
3503 PRINT  INK 1; INVERSE 1; FLASH 1; B
RIGHT 1;AT x,5;"You've won in Europe!!!!
": BEEP .03,x
3504 NEXT x
3505 IF lgin=1 THEN  LET elg=1
3506 IF cpin=1 THEN  LET ecp=1
3507 PAUSE 400: GO TO 3500
```



# Machine Code Graphics

Francis Botto

**Defining characters in machine code.**

Listing 6 is in fact a program which will allow you to obtain a complete assembly language program, capable of defining any characters you may care to draught. If you wish to use listing six, first your program will be stored when you 'list', as an Ascii file entitled "defined"; so you will have to *EXEC"defined" to load it. Also, it is necessary to press Tab after each draughted character, in order to successfully save it. Lastly, if you wish to run it on tape, you will have to adjust line 30.

Listing 7 offers a source code listing in assembly language, which when assembled produces smooth motion. The first part of listing 7, is in fact listing 6 (which is essentially a modified version of the already explained listing 2). However, this time the program simply defines a character, an "e" in fact. As for the operation of listing 7:

Well, starting from scratch, the initial program algorithm was to move the defined character vertically upward from the bottom of the screen to the top. Naturally, as the y dimension in any of the graphics modes extends from 0 to 1024, it would be necessary to accommodate at some stage, a 16-bit number. As such, two registers are utilised. The X register holds the most significant byte of the y dimension, and the Y register contains the least significant byte of the y dimension. The idea is simple, the Y register is incremented (by one) until it equals 255 (or &FF), thus limiting the register contents to a byte, the X register containing the most significant byte of the y dimension is then incremented by one, the Y register is reset to zero, and the cycle repeats until the contents of the X register reaches a specified limit (determined at line 650). This is achieved by adopting two loop structures; of which, *second_loop_move_e_vertically* serves to increment the most significant byte of the y dimension. In listing 7, the X register is limited to three only, as such the maximum y dimension value will be &03FF or 1023.

Though listing 7 produces a motion which is smooth, the "e" does tend to intermittently fade away. Naturally what is needed is a delay between printing and erasing the character. And to remedy this, the following program could be used.

```
611 \.....
612 LDX #&00
613 .delay
614 INX
615 CPX #&FF
616 BNE delay
617 \.....
```

However, if this module were incorporated in listing 7, the X register would be corrupted. As such, use must be made of the stack, to duly save the X register contents. Consequently, a more suitable delay is as follows.

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```
611 TXA             \ Transfer X to A
612 PHA             \ Push accum on to stack
613 LDX #&00
614 .delay
615 INX
616 CPX #&FF
617 BNE delay
618 PLA             \ Pull accum off stack
619 TAX             \ Transfer A to X
```

```
>
   10 REM  Listing  6
   20 REM  F M Botto * 1987 *
   30 *D.
   40 DIM res%(8,8),d%(8,25),val%(8,8),matrix%(10,10),ME% 50
   50 CH%=230:A%=-1
   60 DATA 128,64,32,16,8,4,2,1
   70 FORZ%=1TO8:RESTORE 60:FORW%=1TO8:READ val%(W%,Z%):NEXT:NEXT
   80 oswrch=&FFE3
   90 FOR rep%=0 TO 2 STEP 2
  100 P%=ME%
  110 [
  120 OPT rep%
  130 .matrix:LDX#0:.loop:LDA dbase,X:JSRoswrch:INX:CPX#20:BNE loop:RTS
  140 .dbase
  150 EQUD&81FFE617
  160 EQUD&81818181
  170 EQUW&FF81
  180 EQUD&7E00E717
  190 EQUD&7E7E7E7E
  200 EQUW&007E
  210 ]
  220 NEXT:CALL matrix
  230 MODE1
  240 VDU&13,0,7;0;&13,3,3;0;&13,130,1;0;
  250 COLOUR 130:FORWW%=11TO30:VDU&1F,0,WW%:PRINT"
        ":NEXT
  260 VDU18,00,&E3,&18,25;723;305;995;16,18,00,&E6,&18,20;728;298;1000;16
  270 PRINTTAB(10,2)"Cursor keys";TAB(10,3)"Space bar";TAB(10,4)"DELETE";TAB(10,
6)"TAB to draw character.";TAB(10,8)"RETURN for listing."
  280 PROCdraught_matrix
  290 DEFPROCdraught_matrix
  300 A%=A%+1
  310 IF A%>24 PROClist
  320 VDU&1F,20,0:PRINT;CH%+A%;" (or &";~(CH%+A%);")"
  330 FORY%=1TO8
  340 FORX%=1TO8
  350 VDU&1F,X%,Y%,&E6
  360 NEXT:NEXT
  370 VDU28,10,5,37,0,&1F,0,0
  380 COLOUR129
  390 PRINT;"CHARACTER ";CH%+A%;" (or &";~(CH%+A%);")"
  400 VDU 26,&1F,8,8
  410 REPEAT
  420 IFINKEY(-74)PROClist
  430 IFINKEY(-122)X%=X%+1
  440 IFINKEY(-26)X%=X%-1
  450 IFINKEY(-42)THENY%=Y%+1
  460 IFINKEY(-58)THENY%=Y%-1
  470 IFINKEY(-97)PROCupdate
  480 IFINKEY(-99)matrix%(X%,Y%)=1:VDU&1F,X%,Y%,&E7:SOUND1,-5,150,2
  490 IFINKEY(-90)matrix%(X%,Y%)=0:VDU&1F,X%,Y%,&E6:SOUND1,-5,50,2
  500 VDU&1F,X%,Y%
  510 FORdelay%=0TO450:NEXT
  520 UNTIL X%=101
  530 DEFPROCupdate
  540 FORZ%=1TO8:FORW%=1TO8
  550 res%(W%,Z%)=0:NEXT:NEXT
  560 FORZ%=1TO8:FORW%=1TO8
  570 res%(W%,Z%)=val%(W%,Z%)*matrix%(W%,Z%):NEXT:NEXT
  580 FORZ%=1TO8:FORW%=1TO8
  590 d%(Z%,A%)=d%(Z%,A%)+res%(W%,Z%)
  600 matrix%(W%,Z%)=0:NEXT:NEXT
  610 VDU&17,&E9,d%(1,A%),d%(2,A%),d%(3,A%)
  620 VDUd%(4,A%),d%(5,A%),d%(6,A%),d%(7,A%),d%(8,A%)
  630 VDU&1F,28,1,&0A,&7F,&E9:PRINT" ";CH%+A%;" or &";~(CH%+A%)
  640 VDU&1F,6,10:PRINT"Store character ";CH%+A%;"?";" Y/N":VDU&1E
  650 ONERRORGOTO660
  660 REPEAT:OO%=GET:UNTILOO%=78OROO%=89
  670 IFOO%=78A%=A%-1:Q%=Q%-1ELSEA%=A%
  680 VDU&1F,6,10:PRINT"                    ":GOTO300
  690 DEF PROClist
  700 c%=0:COLOUR130:PRINTTAB(0,30)"SHIFT"
  710 VDU28,0,29,38,11,&1F,0,17,&0C,14
  720 *SPOOL "defined"
  730 PRINT" 10 REM  Characters"
  740 PRINT" 20 REM  By ???"
  750 PRINT" 30 REM  (C) 1987 "
  760 PRINT" 40 oswrch=&FFE3"
  770 PRINT" 50 DIM MC% 1000"
  780 PRINT" 60 FOR opt%=0 TO 2 STEP 2"
  790 PRINT" 70 P%=MC%"
  800 PRINT" 80 ["
  810 PRINT" 90 OPT opt%"
  820 PRINT"100 .character_code"
  830 PRINT"110 LDY#&0"
  840 PRINT"120 .loop LDA character_data,Y"
  850 PRINT"130 JSR oswrch"
  860 PRINT"140 INY"
  870 PRINT"150 CPY #";A%*10
  880 PRINT"160 BNE loop"
  890 PRINT"170 RTS"
  900 PRINT"180 \...."
  910 PRINT"190 .character_data"
  920 FOR Q%=0TOA%-1
  930 c%=c%+9
  940 VDU&17,&E9,d%(1,Q%),d%(2,Q%),d%(3,Q%)
  950 VDUd%(4,Q%),d%(5,Q%),d%(6,Q%),d%(7,Q%),d%(8,Q%)
  960 PRINT';(c%+12)*10;" EQUW &";~(230+Q%);"17"
  970 PRINT;(c%+13)*10;" EQUB &";~d%(1,Q%)
  980 PRINT;(c%+14)*10;" EQUB &";~d%(2,Q%)
  990 PRINT;(c%+15)*10;" EQUB &";~d%(3,Q%)
 1000 PRINT;(c%+16)*10;" EQUB &";~d%(4,Q%)
 1010 PRINT;(c%+17)*10;" EQUB &";~d%(5,Q%)
 1020 PRINT;(c%+18)*10;" EQUB &";~d%(6,Q%)
 1030 PRINT;(c%+19)*10;" EQUB &";~d%(7,Q%)
 1040 PRINT;(c%+20)*10;" EQUB &";~d%(8,Q%);"       \ ";
 1050 VDU&E9
 1060 NEXT
 1070 PRINT;'(c%+21)*10;" ]"
 1080 PRINT;(c%+22)*10;" NEXT opt%"
 1090 PRINT;(c%+23)*10;" MODE 1"
 1100 PRINT;(c%+24)*10;" CALL character_code"
 1110 *SPOOL
 1120 IFA%>24:END
 1130 REPEAT:UNTILINKEY(-1):VDU26:PRINTTAB(0,30)"     ":GOTO320
>
   10 REM  Listing 7
   20 REM  F M Botto * 1987 *
   30
   40 OSWRCH=&FFEE
   50 DIM ME% 100
   60 FOR rep%=0 TO 2 STEP 2
   70 P%=ME%
   80
   90 [
  100 OPT rep%
  110 \.................................
  120 .define_character
  130 LDX #&0          \ Utilise the X register as a loop counter.
  140 .loop_define_character
  150 LDA data_area,X  \ Read element of data_area determined by X.
  160 JSR OSWRCH       \ Unconditional jump to OSWRCH routine.
  170 INX              \ Increment loop counter by one.
  180 CPX #&18         \ Have all data_area elements been read?
  190 BNE loop_define_character \ If not loop.
  200 RTS              \ Return from subroutine to BASIC.
  210 \.................................
  220 .data_area
  230 EQUW &0516       \ Equivalent to MODE5 or VDU22,5 or VDU&16,&5
  240 EQUW &0112       \ Equivalent to COLOUR.
  250 EQUB &05         \ Set text colour to red.
  260 EQUB &05         \ Allows text to be written at graphics cursor.
  270 EQUW &FF17       \ Define character (=VDU23,255,.....)
  280 EQUD &6462321C   \ Data forming character
  290 EQUD &38666068   \ Data ,, ,, ,, ,, ,, ,,
  300 EQUW &0419       \ Move graphics cursor, equivalent to
  310                  \ PLOT04 or MOVE.
  320 EQUW &028A       \ x dimension,
  330 EQUW &01F4       \ y dimension.
  340 EQUB &FF         \ Defined character.
  350 EQUB &04         \ Return to writing text from text cursor.
  360 \.................................
  370 \ Subroutine to move the defined character follows.
  380 \.................................
  390 .move_e_vertically
  400 LDA #&05         \ Allows text to be written at graphics cursor.
  410 JSR OSWRCH
  420 LDX #&0          \ Reset MSByte of Y dimension to zero.
  430 .first_loop_move_e_vertically
  440 LDY #&0          \ Reset LSByte of Y dimension to zero.
  450 .second_loop_move_e_vertically
  460 LDA #&19         \ Equivalent to VDU 25 or PLOT.
  470 JSR OSWRCH
  480 LDA #&04         \ MOVE graphics cursor to position
  490                  \ determined by following coordinates.
  500 JSR OSWRCH
  510 LDA #&8A         \ LSByte of X dimension.
  520 JSR OSWRCH
  530 LDA #&02         \ MSByte of X dimension.
  540 JSR OSWRCH
  550 TYA              \ Transfer LSByte of Y dimension to accumulator.
  560 JSR OSWRCH
  570 TXA              \ Transfer MSByte of Y dimension to accumulator.
  580 JSR OSWRCH
  590 LDA #&FF         \ Print defined character at graphics cursor.
  600 JSR OSWRCH
  610 LDA #&7F         \ Backspace and delete printed character.
  620 JSR OSWRCH
  630 INY              \ Increment LSByte of Y dimension.
  640 CPY #&FF         \ Test LSByte of Y dimension, loop if
  650                  \ less than 255.
  660 BNE second_loop_move_e_vertically
  670 INX              \ Increment MSByte of Y dimension.
  680 CPX #&4          \ Test MSByte of Y dimension, loop if
  690                  \ less than 4.
  700 BNE first_loop_move_e_vertically
  710 RTS              \ Return from subroutine to BASIC.
  720 \.................................
  730 ]
  740 NEXT rep%
  750 CALL define_character
  760 CALL move_e_vertically
  770 END
>
```

# Starfield

Julien Francois

Yes, another scrolling starfield listing. But before you start bleating consider that this one has over sixty non-flickering sprites on the screen. The starfield has eight layers and will run simultaneously with most other programs.

Take care when using other sprites as the Vic II chip cannot display two equal priority sprites on the same raster line.

To reload the program, after entering and saving, type *LOAD "",1,1* and then *SYS 16384* to start.

```
0 REM ********************************
1 REM * (C) JULIEN FRANCOIS  1987.   *
2 REM * WHEN DATA HAS BEEN CORRECTLY *
3 REM * ENTERED POKE43,0  :POKE44,64 *
4 REM *          POKE44,138:POKE46,66 *
5 REM * THEN:                        *
6 REM * SAVE"STARFIELD:16384",1,1     *
7 REM * TO EXECUTE, TYPE: SYS16384   *
8 REM ********************************
9 POKE56,50:PRINT"■":I=40:A=16384
10 B=0:FORT=0TO6:READD:POKEA+T,D:B=B+D:NEXT
15 READD:IFB<>DTHENPRINT"■■DATA ERROR■ IN
LINE (C) IKON PRODUCTIONS ":NEW:";I:END
20 A=A+7:I=I+1:IFI<133THEN10
25 SYS16384
30 POKE53275,255:POKE53280,11:PRINT"■■■■
40 DATA 162,250,169,32,157,255,3,1028
41 DATA 157,249,4,157,243,5,157,972
42 DATA 237,6,169,0,157,255,215,1039
43 DATA 157,249,216,157,243,217,157,1396
44 DATA 237,218,202,208,225,141,33,1264
45 DATA 208,141,32,208,141,28,208,966
46 DATA 141,29,208,141,23,208,141,891
47 DATA 241,79,32,115,66,169,1,703
48 DATA 162,8,202,157,39,208,208,984
49 DATA 250,169,79,133,252,169,0,1052
50 DATA 133,251,133,253,164,253,192,1379
51 DATA 8,240,38,162,160,138,145,891
52 DATA 251,200,192,8,240,8,196,1095
53 DATA 253,240,9,232,76,82,64,956
54 DATA 160,0,76,90,64,165,251,806
55 DATA 24,105,8,133,251,166,253,940
56 DATA 232,134,253,76,74,64,162,935
57 DATA 81,189,217,65,157,95,79,883
58 DATA 202,208,247,32,215,65,120,1089
59 DATA 169,180,141,20,3,169,64,746
60 DATA 141,21,3,169,255,141,21,751
61 DATA 208,169,49,141,18,208,141,934
62 DATA 240,79,173,17,208,41,127,885
63 DATA 141,17,208,173,26,208,9,782
64 DATA 1,141,26,208,88,96,76,636
65 DATA 49,234,76,67,65,169,1,681
66 DATA 44,25,208,240,243,173,25,958
67 DATA 208,9,1,141,25,208,174,766
68 DATA 241,79,224,8,240,231,174,1197
69 DATA 240,79,232,232,232,232,138,1385
70 DATA 162,0,157,1,208,232,232,992
71 DATA 224,16,208,247,174,241,79,1189
72 DATA 189,224,79,141,16,208,169,1026
73 DATA 79,133,252,169,96,133,251,1113
74 DATA 172,241,79,240,11,165,251,1159
75 DATA 24,105,8,133,251,136,76,733
76 DATA 241,64,160,0,162,0,177,804
77 DATA 251,157,0,208,232,232,200,1280
78 DATA 192,8,208,244,169,79,133,1033
79 DATA 252,169,0,133,251,172,241,1218
80 DATA 79,240,11,165,251,24,105,875
81 DATA 8,133,251,136,76,25,65,634
82 DATA 160,0,177,251,153,248,7,996
83 DATA 200,192,8,208,246,238,241,1333
84 DATA 79,173,240,79,24,105,25,725
85 DATA 141,240,79,141,18,208,173,1000
86 DATA 17,208,41,127,141,17,208,759
87 DATA 173,26,208,9,1,141,26,584
88 DATA 208,104,168,104,170,104,64,922
89 DATA 169,0,141,243,79,169,79,880
90 DATA 133,252,169,95,133,251,160,1193
91 DATA 1,169,8,141,242,79,177,817
92 DATA 251,56,237,242,79,144,33,1042
93 DATA 240,31,145,251,206,242,79,1194
94 DATA 200,192,9,208,236,174,243,1262
95 DATA 79,232,224,8,240,70,142,995
96 DATA 243,79,165,251,24,105,8,875
97 DATA 133,251,76,100,65,174,243,1042
98 DATA 79,152,72,169,1,136,240,849
99 DATA 4,10,76,155,65,141,244,695
100 DATA 79,61,224,79,240,12,173,868
101 DATA 244,79,93,224,79,157,224,1100
102 DATA 79,76,198,65,173,244,79,914
103 DATA 29,224,79,157,224,79,104,896
104 DATA 168,169,80,76,117,65,104,779
105 DATA 168,169,255,76,117,65,169,1019
106 DATA 0,141,241,79,169,49,76,755
107 DATA 59,65,162,1,181,37,157,662
108 DATA 223,79,202,208,248,96,12,1068
109 DATA 4,15,14,18,4,57,8,120
110 DATA 84,16,105,64,127,1,145,542
111 DATA 0,147,16,151,2,153,4,473
112 DATA 185,128,191,2,198,1,201,906
113 DATA 2,221,64,247,16,255,8,813
114 DATA 5,1,57,64,63,16,101,307
115 DATA 16,148,1,164,64,183,32,608
116 DATA 191,1,204,64,239,2,242,943
117 DATA 1,225,2,49,57,56,55,445
118 DATA 32,91,67,93,32,74,65,474
119 DATA 76,73,69,78,32,70,82,480
120 DATA 65,78,67,79,73,83,32,477
121 DATA 84,69,76,58,32,53,49,421
122 DATA 52,45,49,52,54,54,169,475
123 DATA 40,133,252,162,0,160,0,747
124 DATA 169,36,141,243,79,32,97,797
125 DATA 66,169,60,141,243,79,169,927
126 DATA 41,133,252,32,97,66,96,717
127 DATA 169,226,65,133,251,232,189,1285
128 DATA 226,65,145,251,232,236,243,1398
129 DATA 79,208,239,96,162,200,169,1153
130 DATA 0,157,216,39,157,150,40,759
131 DATA 157,94,41,202,208,244,76,1022
132 DATA 68,66,0,0,255,255,0,644
```

# Attention!

Unfortunately due to the sheer volume of submissions our returns department has been unable to cope satisfactorily. So, from now on we are requesting that you include a suitable stamped addressed envelope for return of your submission. Not enclosing a suitable SAE will mean that your program will not be returned. You have been warned.

The beneficial side of this system is that 90% of submissions will be returned within one week. A small price to pay for such a service I'm sure you'll agree.

With regards to future submissions we are looking for articles on programming in general, utility programs and applications software and lastly, good games. Here are a few types of program we don't want: Educational, hangman, pools predictors, mastermind, flashing borders, bank accounts, disc catalogues and clocks.

If you can't get a program listing in the magazine to work ring in to see whether it was faulty rather than writing. If there were problems then we'd let you know. Corrections normally appear a couple of weeks later. Thanks.

**Duncan Evans**
**Technical Editor**

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(324)

# Pause

G Thomson

One common command that is not implemented on the Amstrad CPC's is one to pause the program. This RSX, *:WAIT,n* where *n* is the delay in 50ths of a second will do the trick.

```
LISTING 3

100 REM WAIT RSX
110 REM
120 FOR A=1 TO 48:READ X$:POKE &9FFF+A,VAL
    ("&"+X$)
130 CK=CK+VAL("&"+X$):NEXT
140 IF CK<>4989 THEN PRINT"ERROR IN DATA!":END
150 CALL &A000:PRINT"|WAIT,n  ENABLED.":DELETE
    100-190
160 DATA 21,13,A0,01,09,A0,C3,D1,BC,0E,A0,C3
170 DATA 17,A0,57,41,49,D4,00,00,00,00,00,DD
180 DATA 6E,00,DD,66,01,CD,19,BD,3E,FF,3D,FE
190 DATA 00,C?,22,A0,2B,7D,B4,C2,1D,A0,C9,00
```

# Directory Display

Andrew Oakley

Another C64 routine. This one lets you display a disc directory without overwriting the Basic program currently in memory. To use enter *SYS 49152*.

```
5 REM *DIRECTORY DISPLAY BY ANDREW OAKLEY*
10 X=49152
20 READZ:IFZ>-1ANDZ<256THENPOKEX,Z:X=X+1:GOTO20
30 DATA169,36,133,2,169,1,162,2,160,0,32,189,255,169,8,170,32,186,255,32,192
40 DATA255,169,8,32,180,255,169,0,32,150,255,169,0,133,144,160,3,132,143,32,165
50 DATA255,133,195,32,165,255,133,196,164,144,208,53,198,143,208,238,166,195
60 DATA165,196,32,205,189,169,32,32,22,231,32,165,255,166,144,208,30,170,208
70 DATA9,169,13,32,22,231,160,2,208,205,32,22,231,32,228,255,201,0,240,227,32
80 DATA228,255,170,240,250,208,219,169,8,32,195,255,76,204,255,0,0,169,192,133
90 DATA5,162,6,160,0,132,2,132,4,177,2,145,4,200,208,249,230,3,230,5,202,208
100 DATA242,96,500:NEW
```

# Auto Data

D J Cook

This C64 routine is an autonumber but with the extra facility of including a string which is printed immediately after the line number. The syntax is *SYS 49152, start no, increment, string.*

Press *F7* to get each new line up.

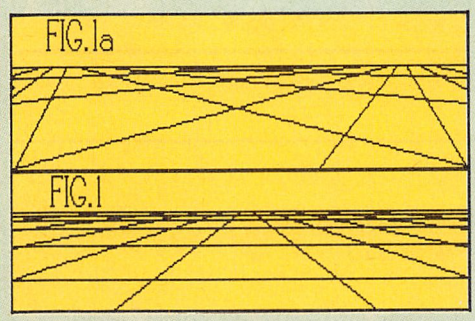
```
LIST
    10 J=49152
    20 READA: IF A=-1 THEN GOTO 60
    30 C=C+A: C2=C2+A*(J-49151)
    40 POKEJ,A
    50 J=J+1: GOTO20
    60 IF C<>15197 OR C2<>1046265 THEN PRINT
       "CHECKSUM ERROR"
   100 DATA 169,0,160,80,153,0,193,136,16,250
   101 DATA 32,115,0,32,158,173,32,247,183,165
   102 DATA 20,141,81,192,165,21,141,82,192,32
   103 DATA 115,0,32,158,173,32,247,183,165,20
   104 DATA 141,83,192,32,115,0,32,158,173,32
   105 DATA 163,182,201,80,48,2,169,80,168,136
   106 DATA 177,34,153,0,193,136,16,248,120,169
   107 DATA 84,141,20,3,169,192,141,21,3,88
   108 DATA 96,0,0,0,165,211,201,0,208,6
   109 DATA 169,3,197,197,240,3,76,49,234,174
   110 DATA 81,192,173,82,192,32,205,189,169,0
   111 DATA 160,193,32,30,171,173,81,192,24,109
   112 DATA 83,192,144,3,238,82,192,141,81,192
   113 DATA 76,49,234,-1
>*W.
WORDWISE
```

# PUTTING THINGS IN PERSPECTIVE

In this second part of his four-part series, Paul McKinley reveals how to add depth and perspective to your computer graphic creations.

Last week I showed you how to draw a simple Mickey Mouse face using mainly circle and line commands. This week I would like to start off by expanding a little on the uses of the line function.

Two of the first things you'll learn in any art class are the importance of the horizon line and the use of perspective in your drawings. As an example of their use I'll draw a picture of a wizard's tower set on a giant chess board with two moons in the background.




## Horizon

Before you start drawing, it must be decided where the horizon line will be. That means exactly what it sounds like, the line where the ground meets the sky. Imagine yourself looking at the scene. Are you at ground level or part way up a mountain or even flying about above the tower? This is important because, in general, the higher up the observer's viewpoint is, the higher up the screen the horizon line should be. When the observer is standing on the ground the horizon should be in the lower third of the screen, or in the centre if the observer is up a mountain, and in the top third of the screen if the observer is flying. It is perfectly possible, if the observer is high enough, for the horizon to be off the top of the screen completely. For now we'll have the observer at ground level and so draw the horizon low down the screen.

This is simply a line from one side of the screen to the other. When drawing long straight lines always check that they have no "steps" in them before drawing anything else so you can use 'undo' to remove them and re-draw. Now I'll draw the horizontal lines of the chessboard. Since the squares will look smaller the further away they are, the lines will get closer together towards the horizon. Use 'magnify' at one side of the screen to draw a short line one pixel underneath the horizon line. Returning to the full screen I use that short line as the starter for a line across the screen. Repeat the process, using 'magnify' to draw a third line two pixels under the second line then a fourth line six pixels under that and so on until you reach the bottom of the screen. Notice how this already gives the impression of the horizon stretching away into the distance. To draw the vertical lines of the board, simply take two points about halfway along the horizon line and drop lines down and to each side. Drawing more lines from the horizon to each side at increasing angles gives fig. 1. Now just fill every alternate square to complete the chess board pattern. You might like to try leaving out the horizontal lines and drawing lines from points near each end of the horizon line to produce an 'edge on' effect (fig. 1a).

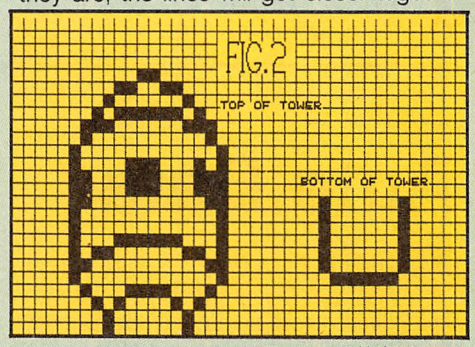
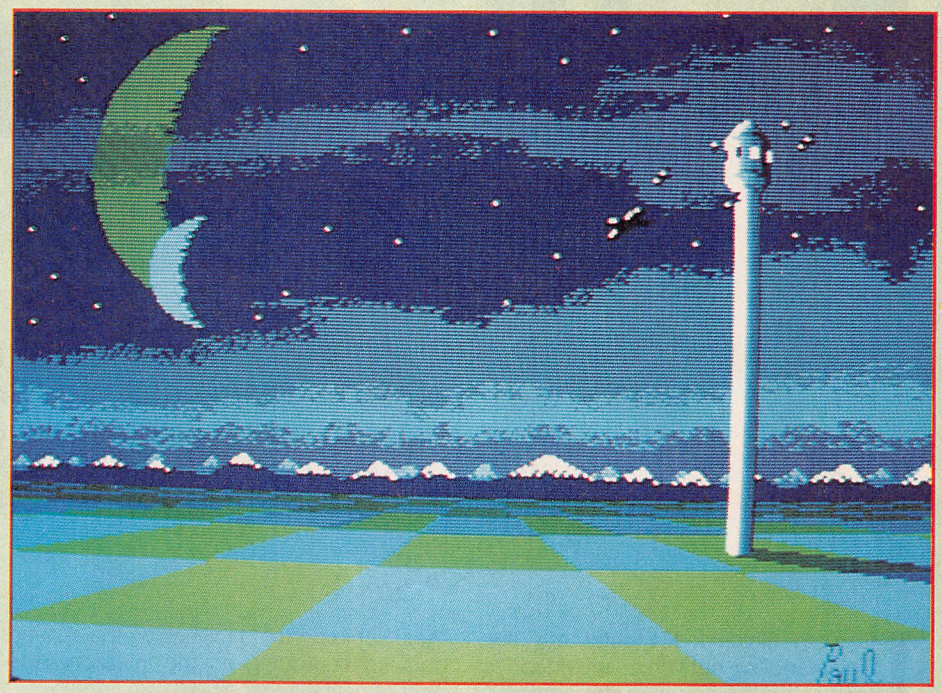
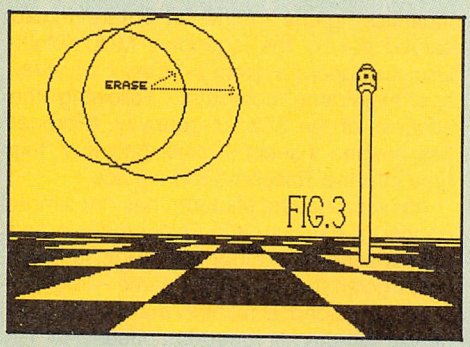



**Fig. 1 (left): creating a chess board pattern that fades into the horizon is really quite simple. Fig. 2 (right): doing details in magnify mode. Below: mountain ranges are easy to produce by drawing a series of triangles. Page 29 (top right): the finished product in full colour (Fig. 5).**

## The tower

Drawing the tower is quite simple. Take two parallel lines from one of the squares on the right and bring them up into the top third of the screen. The bottom of the lines are joined with a slight downward curve to give the impression of the tower being a solid cylinder. Since the observer is looking up at the tower, the top of the lines are joined with an upward curve. 'Erase' gets rid of any overlapping chessboard pattern leaving a blank cylinder. A plain cylinder is not very interesting in itself so you can add a fancy top to it (fig. 2). It's best to put in this sort of detail in 'magnify' mode. First I'll make the top wider by adding three pixels diagonally to the corners and joining them with another upward curve. Now I draw a line of ten pixels up from each corner and again join their tops with a curve. A semi-circle of pixels on top will be a roof. Windows can now be added but remember that windows at the sides are being seen at an angle and they will follow the curve of the tower so they will appear narrower and slightly lower down.





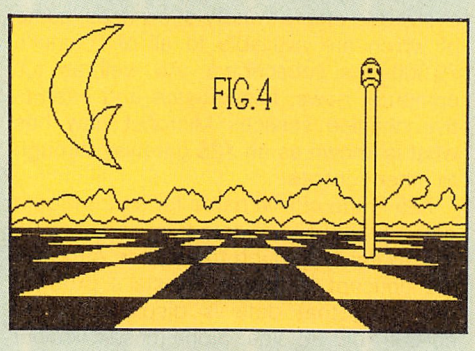

## Planets

For the planets I use the circle function to draw two overlapping circles, making sure that the right hand circle bisects only the top and bottom of the left hand circle as in fig. 3. As you can see this forms a crescent on the left which is the effect I want so now I can erase all the lines I don't need. Repeating the process on a smaller scale in front of the first crescent produces fig. 4.

The planets serve several functions in this picture. First, they provide 'balance' for the tower. If they were not there or if they were behind the tower the eye would be drawn to the right and the picture would look lop-sided. This can also happen with colours. You can test this for yourself by drawing two identical squares on a plain background and filling one with blue and the other with yellow. Your eye will be drawn to the strong dark colour.

Second, they help provide depth and perspective, an impression of very large objects existing very far back in the picture. Drawing the small planet in front of the larger also helps give a sense of scale to the background. If the small planet is moon sized then the large planet behind it is very large indeed.

Third (and most subjective), they provide a touch of strangeness. Anyone seeing the two worlds in the background will know immediately that this is not a scene from earth but rather some weird alien world full of strange peoples and unknown dangers!




## Mountains, cloud, shadow

The horizon looks a bit bare so I'll add a range of mountains and some low cloud to make it more interesting. The mountains are just a series of irregular triangles not quite touching the horizon line. Realistic clouds are slightly harder to draw and there are several types. The easiest in this case are cumulus clouds, the big fleecy kind you see on warm summer days.

These can be drawn in two ways; as a series of small overlapping circles with any intersecting lines erased or freehand with the 'draw' function. Freehand is probably best unless you have a very unsteady hand. Before drawing in the clouds it's best to save the picture as it is all too easy to make a mess of it when drawing freehand and it may be easier to re-load the picture than clean it up even with 'undo'. It's good practice to save your pictures regularly in any case. It can get a bit tedious with tape systems but it may save you the expense of taking an axe to your machine when you lose the results of a morning's hard mouse pushing.

If you want to experiment with drawing clouds remember that the underside is flat (or nearly so) and in shadow so it should be a slightly darker colour than the top. But that sort of detail is not needed here, just a fluffy line will do to indicate distant cloud.

One last piece of detailing will finish off this picture: shadow. Because of the two planets in the background I know the light is coming from the left and slightly behind the tower. This means that the tower will throw a shadow right and forward and that part of the tower itself will be in shadow. Since the tower is a cylinder there will be three sections to the shadowing. The left side in direct light, the right side in full shadow and an area between them where full light shades into full shadow. The shadow on the tower is achieved simply by drawing a line down its length and filling the enclosed space with solid black. The shading effect can be achieved by drawing another line to the left and filling that area with a checkerboard pattern and then drawing over the line in white so the border won't be sharp edged. A second way to do this is to use a 'spray' function down the black/white border. This gives a pleasant textured look to the tower but care must be taken to keep the spray in a straight line.

The ground shadow is formed by drawing two lines from the base of the tower right and slightly down then filling any white areas. The lines should be slightly wider apart away from the tower.

I now have fig. 5. You can experiment with various background fills but remember to save the picture first. This black and white picture can be copied on any computer but if you would like to add colour I've included a colour version (with slight changes) as a guide. As a rule darker colours look further back than light ones. Unless you own a sixteen bit machine or an Enterprise you won't be able to duplicate all the colours. This does not mean eight bit computers can't produce good colour displays – just that a bit of planning is needed to get the best from them. I'll cover this subject next week.

# The Micronet gateway to Gold

Micronet 800, the popular microcomputing area on Prestel, has recently opened up a unique gateway into Telecom Gold, another of BT's value-added networks. Here, Steve Gold examines the gateway, and assesses its implications . . .

Telecom Gold and Prestel are two value-added networks provided to end users by, and over the networks of, British Telecom. Both services are accessible via a range of computers and/or dedicated terminals, using a modem and appropriate software as required.

There the similarity stops however, as Telecom Gold – five years old this April – is primarily an electronic mail (Email for short) network with database services grafted on, whilst Prestel is primarily an information-oriented database with Email facilities only relatively recently added on.

Whilst Prestel was launched as an information service in 1979 – basically as an interactive (and much larger version of Ceefax and Oracle) – Micronet, the micro-computing arm of Prestel, was launched in 1983, about the same time that Prestel's mailbox arrived on the scene.

Since then, both the Micronet and Prestel mailboxes have grown to become two of the most important facilities on the service, both concentrating on the interactive aspect of online services.

Prestel mailbox currently offers Email service to other subscribers, with both incoming and outgoing telex services available on a "pay as you use" basis. Micronet, with its 20,000-plus subscriber base, has evolved to offer a variety of services, some of which are available to all of Prestel's 70,000-plus subscribers. As well as full computer news, telesoftware and interactive chatline services Micronet now has what is known as an X25 gateway through to other services.

X25 is the official name for an intelligent gateway that allows data from one network to flow easily through to another. Although the concept is simple, Prestel's problem has been that data is displayed in 40 column by 20 line alpha-mosaic colour graphic format (7 bit, even parity, 2 stop bits), whilst most other online services, Telecom Gold included, operate in a scrolling, 80 column Ascii format (8 bit, no parity, 1 stop bit).

**Micronet's welcoming new look**

The first Micronet/Ascii service gateway opened up earlier this year to Shades, a multi-user game in the adventure mould carved out by the legendary MUD (Multi-User Dungeon) system on Essex University's mainframe computer. Following the success of the Shades gateway, Micronet has opened a second major gateway, this time into the Telecom Gold service.

As with Shades, Micronet has not simply opened a gateway into Telecom Gold and left subscribers to muddle through. Instead, it has given the gateway a name – Interlink – and provided a full information support service on the Micronet database.

## Free Mailboxes

Subscribers to Interlink can obtain a "free" mailbox on the Telecom Gold network, paying for use as they go. Like Prestel, Telecom Gold is split across several computers. Unlike Prestel however, Telecom Gold subscribers may only be registered on a single computer (a numbered system). Thus, each UK Telecom Gold subscriber has a system number in prefix to his/her six to eight digit alpha-numeric mailbox address.

The Interlink gateway is currently available to mailboxes on Telecom Gold's system 74. Plans are in hand for other system gateways to be opened up as demand builds up.

As mentioned, subscribers to Micronet are offered free initial sign-up to Telecom Gold, in the guise of an Interlink mailbox on system 74, effectively allowing access to the 70,000 plus Telecom Gold scubscribers in the UK (coincidentally the same number of subscribers as Prestel claims to have), and several tens of thousands of foreign Dialcom-affiliated Email networks, of which Telecom Gold is the organiser.

Telecom Gold's online charges are somewhat higher than those of Prestel. Peak rate access (Monday to Friday, 8am to 7pm) costs 11p a minute, whilst off-peak access

(all other times) costs 3.5p a minute. Out of London subscribers to Telecom Gold normally have to pay a surcharge of 2.5p or 3.0p a minute (for 300 baud and higher speeds respectively) for access via BT's PSS and other data networks. Use of such data networks means that subscribers do not have to place a long-distance call to London to access Telecom Gold.

Subscribers to the Interlink service on Micronet may use the gateway for a low 1 pence a minute surcharge, which compares favourably with the 2.5/3 pence a minute levied for PSS and other data network access. Currently, Interlink gateway charges are waived for pioneer subscribers.

**"The First Micronet service gateway opened up earlier this year to Shades, a multi-user game in the adventure mould, carved out by the legendary MUD system. Following the success of that, Micronet has opened a second major gateway, this time into Telecom Gold"**

## What Interlink offers

Interlink offers a low-cost means of obtaining an Email address on the Telecom Gold network, with onward access to the variety of gateway services that Gold provides, ranging from the Informatics Daily Bulletin service, through to the Online Airline Guide. Unfortunately such onward gateway services cost between 58 and 200 pence a minute, pricing themselves beyond most casual users' pockets.

Telecom Gold also offers a telex bureau service on an incoming and outgoing basis – a service that is mirrored by the Telexlink service on Prestel. Prices are broadly in line with the Telexlink service, so there is no positive advantage of having a Telecom Gold mailbox for telex services alone.

What Interlink has done, however, is to allow Micronet subscribers a low-cost facility to sign-up to Telecom Gold. It also allows them to dip into the service on a "pay as you use" basis. If the gateway is not used in any particular month, then normally, no charges accrue, unlike accounts on other Telecom Gold systems such as MicroLink, which charges its user £3 a month standing charge.

MicroLink, on system 72, however, also offers an extensive news and telesoftware database within its subscription. This is arguably MicroLink's answer to Micronet, although neither system operator would go so far as to admit to being in competition with one another. Services on separate Telecom Gold computers are not normally accessible to users of other Telecom Gold computers. Thus, the services of MicroLink on system 72 are not available to subscribers of system 74's Interlink system.

**The Interlink index offered by Micronet**

## The disadvantages

The disadvantages of subscribing to both Micronet and to Interlink are few and far between. The most obvious disadvantage is that of the Prestel viewdata format – 40 columns by 20 lines – to which all viewdata networks adhere to. Whilst the gateway software between Micronet and Telecom Gold reformats the scrolling Ascii into a viewdata paged format, the viewdata screen precludes the uploading of pre-prepared text via the gateway. Viewing incoming Email to your Telecom Gold mailbox is similarly limited.

Another slight disadvantage of the gateway is an inherent fault with Telecom Gold generally, the propensity to create backup files, which cost 20 pence a month per block (2K) of storage. Even the simple act of sending Email on Telecom Gold creates a **Mailsave** block which has to be deleted to avoid incurring storage charges.

Telex, on the other hand, creates a semi-permanent 5 block **Telex2** file which is created whenever your first telex is sent out on Telecom Gold. This effectively places a £1 a month (for five blocks) surcharge on the use of telex via Telecom Gold.

In practice I suspect that most Micronet Interlink subscribers will use their system 74 Telecom Gold mailbox as a scrolling Ascii system, accessing it via direct dial or PSS. When connected to Prestel however, it's a simple matter to flip through the gateway to check for incoming Email and, if appropriate, quickly scan the data. If required, you can then log off Prestel and log into Telecom Gold proper to make use of the scrolling Ascii format.

Further information can be obtained from: Micronet 800, Durrant House, 8 Herbal Hill, London EC1R 5EJ. Tel: 01-278 3143.

# What is Micronet?

Micronet is the microcomputing area of BT's Prestel network and currently consists of around 30,000 pages of information, including daily computer news, software and hardware reviews, hints and tips and many other features.

There are also a wide variety of interactive services including telesoftware, electronic mail, telex, celebrity interviews, chatlines, multi-user games and technical support for home and business machines. The company is a joint venture between BT, East Midland Allied Press and Tele-Direct (Canada) Limited, and has a subscriber base of 20,000 plus, serviced by 28 full-time staff in London, and regular contributors around the country.

# CREATING ON THE ST

Mark Jenkins concludes his review of C-Lab's *Creator,* the professional level sequencer for the Atari ST.

This week we're finishing off our look at C-Lab's *Creator,* the fourth professional level sequencer to be released for the Atari ST.

Let's look at the parameters for an individual track of the 60 available. The Status display uses a white block for Clear, a black block for Recorded and a star for Mute, which refers to the simple Hide function or to the Midi information filter function. Each recorded track can be given a name of up to eight letters (such as "Solo", "Part 1" or "DX Vibes") and an instrument name (such as "Pro 2000" or "DX711") in smaller letters.

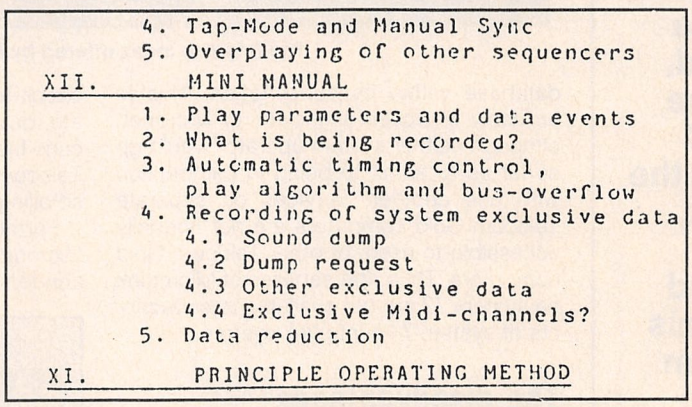
Any Midi channel can be assigned to any track; Midi channel information is retained after merging so you can record complex patterns from an external sequencer onto a single Creator track.

Before or after recording an initial track you can Quantise it, correcting notes in one of four ways – altering note on and off points but retaining note lengths, which preserves the human feel, using the same system but also "taking into account the relationship of the musical notes to each other", simply moving start or stop points to create shorter or longer notes, or quantising all events including pitch bend and other controller information.

Velocity values can also be quantised or compressed, and there's a similar Accent function for volume which wasn't implemented on our review copy. The Ghost function plays the same musical data as an original track but with other Transpose, Quantise or Velocity values, which is handy for trying out changes before making them permanent, and creating echoes, octaves or keyboard splits by merging ghost tracks after using the delay, transpose or note limit functions.

The 'Hide' function mutes tracks at will and you can use the "undo" function to save the previous take of a pattern. Like Steinberg's *Pro-24, Creator* uses left and right locator boxes to define points between which many functions such as punch-in and drop-out will take place. You can loop tracks while in Record although there is a glitch at the end of the loop, and a software Midi Thru/Merge function makes it easier to hear your music on the particular synth module intended to play it if you are using several modules.

Your current position is displayed in terms of bar, beats, ticks and something called takts (baby ticks?) while your current track can be solo'd and the count-in time varied. You can delay or pull forward the Midi clock pulses if you're having sync problems, and the current time of a piece in minutes and seconds plus memory remaining are permanently on display.




**"The Ghost Function plays the same musical data as an original track, but with other Transpose, Quantise or Velocity values, which is handy for trying out changes before making them permanent"**

There are several editing options – you can delete all the notes between or outside the locator boxes, quantise notes, double or halve the speed of a piece, mixdown all recorded channels to Channel One, or demix Midi information played in from an external Midi sequencer to its respective track numbers.

The Event Edit mode lists out all the Midi data contained in a track and allows you to alter bar and beat positions. Midi channel, note values, velocity, length, patch change, pressure and velocity. The display isn't as comprehensive as that on *Iconix,* but you can at least delete and insert events at will, open up gaps in a track, and even edit the system exclusive data used to store synth patches if you have the relevant codes to hand.

*Creator's* Arrange mode lets you place patterns in order on one of four levels a–d; these can be played back simultaneously if desired for 64-track sequencing, and patterns can overlap.

The Arrange mode lets you record a backing in several sections, then record the solo melody over them in one go; so you can place your backing on one level, your melody on a second, drums on the third and leave the fourth blank for later use.

The four levels can all be soloed and entering Pattern Zero makes the song loop; you can even record in Arrange mode, and this is again handy for making a solo span over several backing sections.

Full Midi synchronisation including song pointers is available, although you'll have to use a Midi drum machine or special Interface unit to synchronise to tape. You can set a new tempo using a Tap Mode on the micro's numeric buttons, and can enter notes in step time using the same method, asking *Creator* to move along one step at a time while in Record mode.

Overall the package is very user-friendly, with good labelling of all functions and a sensible though not confusing number of control and editing options. Its synchronisation abilities are on a par with those of Steinberg and *Iconix,* while *MidiTrack* does link to tape but is £100 more expensive at around £350.

However, *Creator* has little of the inspiration of the *Iconix* package and few of its unique features such as soft keys, which offer remote control of the package from your synth keyboard. Though powerful and straightforward, *Creator* needs a very competent shop demo and perhaps a few well-known endorsees before really making its mark.

*Sound Technology, 6 Letchworth Business Park, Avenue 1, Letchworth, Herts SG6 2BB. Tel: 0462 488000.*

*Next week, Mark Jenkins looks at the new UMI 35, a cut down version of the UMI 2B for BBC machines.*

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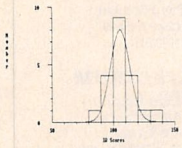

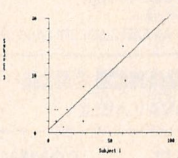

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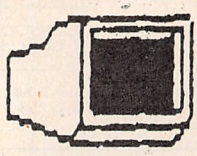

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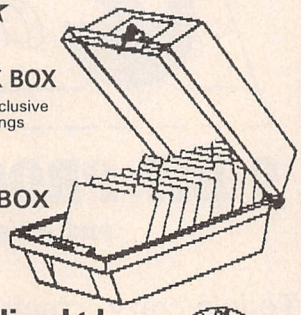

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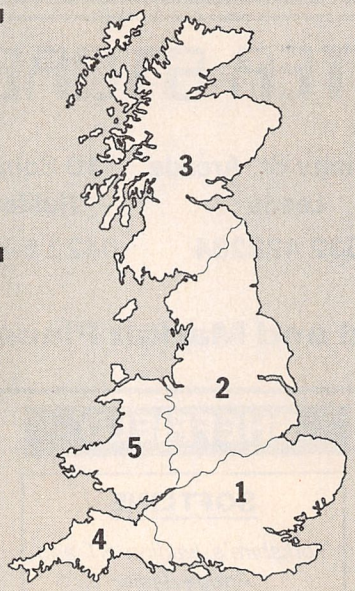


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# Your complete guide to all the software released this week

## Amstrad CPCs

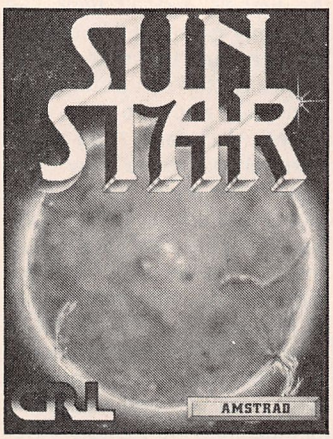
**Program** *First Calc* (CPC6128 only) **Type** Application **Price** £29.95 **Supplier** Minerva Systems, 69 Sidwell Street, Exeter EX4 6PH.

Low cost, but effective spreadsheet, with the accent on user friendliness for a change.

**Program** *BrunWord 6128* (CPC6128 only) **Type** Word processor **Price** £25 **Supplier** Brunning Software, 34 Helston Road, Chelmsford, Essex CM1 5JF.

Wordpro package, complete with spell-check and filing programs.

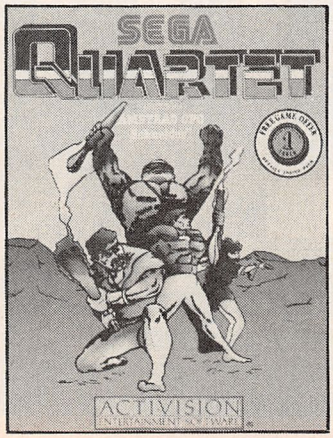
**Program** *Sun Star* **Type** Arcade **Price** £8.95 **Supplier** CRL, CRL House, 9 King's Yard, Carpenter's Road, London E15 2HD.




**Program** *Wonder Boy* **Type** Arcade **Price** £9.99 **Supplier** Activision, 23 Pond Street, London NW3 2PN.

Conversion of the coin-op game. Enjoyable, but a bit over priced perhaps.

**Program** *Quartet* **Type** Arcade **Price** £9.99 **Supplier** Activision, 23 Pond Street, London NW3 2PN.

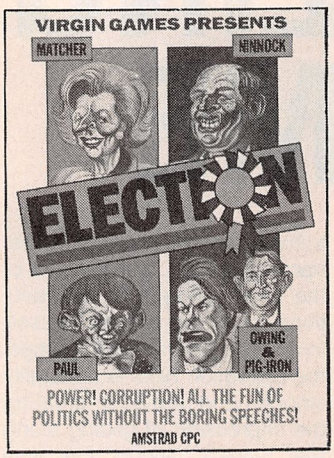



**Program** *Realm* **Type** Arcade **Price** £1.99 **Supplier** Firebird, 64/76 New Oxford Street, London WC1A 1PS.

**Program** *Pyramydya* **Type** Arcade **Price** £2.99 **Supplier** Bug Byte, Victory House, Leicester Place, London WC2H 7NB.

A collect-the-objects avoid-the-monsters arcade game, with cute Egyptian-style graphics.

**Program** *Election* **Type** Simulation **Price** £9.95 **Supplier** Virgin Games, 2–4 Vernon Yard, Portobello Road, London W11 2DX.




With impeccable timing, Virgin releases its spoof election game. The C64 version was out in time for the real thing, but Spectrum and Amstrad versions were delayed until now.

**Program** *Zynaps* **Type** Arcade **Price** £8.95 tape, £14.95 disc **Supplier** Hewson, Hewson House, 56b Milton Trading Estate, Milton, Abingdon, Oxon OX14 4RX.

Amstrad version of one of Hewson's slick shoot 'em ups.

**Program** *Park Patrol* **Type** Arcade **Price** £1.99 **Supplier** Firebird, 64–76 New Oxford Street, London WC1A 1PS.

**Program** *Raging Beast* **Type** Arcade **Price** £1.99 **Supplier** Firebird, 64–76 New Oxford Street, London WC1A 1PS.

## Amstrad PCW

**Program** *Colossus 4 Bridge* **Type** Card game **Price** £15.95 **Supplier** CDS Software, CDS House, Beckett Road, Doncaster DN2 4AD.

**Program** *First Calc* **Type** Application **Price** £29.95 **Supplier** Minerva Systems, 69 Sidwell Street, Exeter EX4 6PH.

## Atari ST

**Program** *Brian Clough's Football Fortunes* **Type** Board game **Price** £17.95 **Supplier** CDS Software, CDS House, Beckett Road, Doncaster DN2 4AD.

**Program** *Barbarian* **Type** Arcade adventure **Price** £24.95 **Supplier** Psygnosis, First Floor, Port of Liverpool Building, Liverpool L3 1BY.

See panel for comment.

**Program** *Jupiter Probe* **Type** Arcade **Price** £14.95 **Supplier** Microdeal, Box 68, St Austell, Cornwall PL25 4YB.

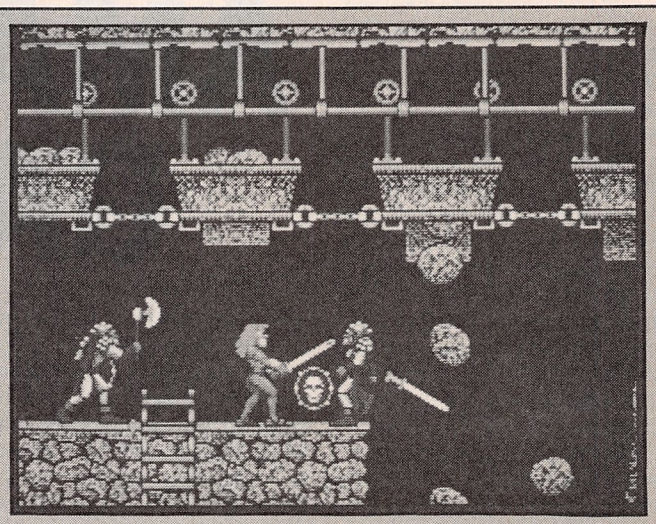
Re-release of an ST shoot 'em up, now at a lower price.

**Program** *Road Runner* **Type** Arcade **Price** £24.99 **Supplier** US Gold, Units 2/3, Holford Way, Holford, Birmingham B6 7AX.

## Atari XL/XE

**Program** *Head Over Heels* **Type**

**continued on page 43 ▶**



**"Hunnn!" shouted Hegor.**

**"Grrrrr!" snarled the fearsome beastie.**

**"HUNNN!" bellowed Hegor, promptly dispatching the fearsome beastie with his equally fearsome weapon. Yes, sampled sound is to the fore as Psygnosis's *Barbarian*, the one that doesn't feature Maria Whittaker, finally emerges from darkest Liverpool.**

**There's the usual sort of plot. Mr Nice and Mr Nasty are brothers. Mr Nice makes a half baked job destroying Mr Nasty, who then gets a bit upset and sets his fat dragon on Mr Nice. Chomp. Son of Mr Nice vows to search through Mr Nasty's underground kingdom and kill the lot of them.**

**This is where you come in, controlling Hegor. So, sword in hand, it's down the underground for a spot of monster mangling. Control is basically mouse powered, with a set of icons along the bottom of the screen for moving left, right, up and down, stopping, jumping, running, attacking, defending, and for the completely spineless, fleeing. You can use a joystick but the response makes it unfeasible.**

**As you progress down through the nightmare world of Durgan, avoiding the pits, the traps, the ambushes from archers in trapdoors, the most attractive feature of *Barbarian* is readily apparent. The graphics, in the form of the scenery and beautifully designed monsters, are superb. There is little to hold a light to them in this particular field of arcade adventure.**

**The sound effects are all sampled. Growls, snarls, barks and grunts complement the action. Unfortunately, what is not up to the same high standard is the animation. Like the previous Psygnosis release, *Arena*, the characters lurch along. Both the ST and Amiga versions share this feature. The two versions are in fact, almost identical.**

**Still, if monster mangling appeals then *Barbarian* will have you grunting with the best of them.**

**Duncan Evans**

Hall of Fame

**Program** *Micronaut 1* **Type** Arcade
**Price** £9.95 **Supplier** Nexus, DSB House, 30 High Street, Beckenham, Kent BR3 1AY.

# A TRULY AMAZING GAME

To be honest, this type of 3D maze game normally leaves me a bit bored, since more thought is sometimes put into the mathematics involved in generating the maze than into the game design. This leaves the poor player wandering around endless wire-frame corridors wondering if something interesting is ever likely to happen (remember *Gyron*?).

However, *Micronaut 1* manages to add an element of playability to the formula that makes it much more substantial than others in the same mould.

The plot tells you all about the semi-organic biocomputer that it is your duty to protect. This computer is made up of a vast network of tunnels through which energy clouds pass as it functions. But the tunnels are also the breeding place of the Scrim, a mutated breed of fruit-fly which lives off the computer's energy, and generally clogs the place up with their eggs and larvae. They also build webs which can disrupt the flow of energy and cause explosions that may destroy the computer entirely.

Fortunately your beloved Emperor has established the Guild of Equalisers to patrol and protect these computers – which is where you come in. You, in your Micronaut craft, roam the tunnels attempting to wipe out the Scrim and to maintain the delicate balance of the computer's energy levels. To do this you have to locate the four Energy Transfer Units (ETUs) within the computer and adjust their energy levels to prevent explosion.

A system of menus allows you to access the various controls that you will need, and these are selected by moving an arrow to the required option on the main menu. The options available include an overhead scrolling map of the maze, with ETUs marked; an ETU screen for adjusting energy levels; status screen, and even a note pad for jotting down useful information.

However, the main part of the game is the exploration of the tunnels and chasing the Scrim in their various forms. The viewscreen presents you with the view from the cockpit of your craft, with the tunnel taking up most of the screen and the lower section showing your own energy levels and navigation info.

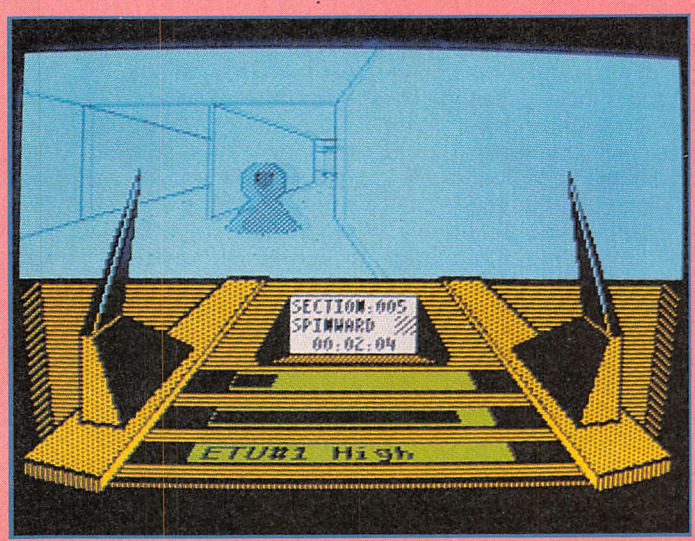
As mentioned, the maze of tunnels is drawn with wire-frame graphics, but instead of the usual jerkily animated sections of corridor that we're used to in Spectrum maze games, the animation here is unusually smooth and realistic, creating the impression of gliding along the tunnels. Along the way you'll encounter the Scrim in various stages of their life-cycle (egg, larva, adult) and you can go chasing along the tunnels in an attempt to destroy them, or you can explore in order to learn more of the layout of the computer and locate the all important Energy Transfer Units.

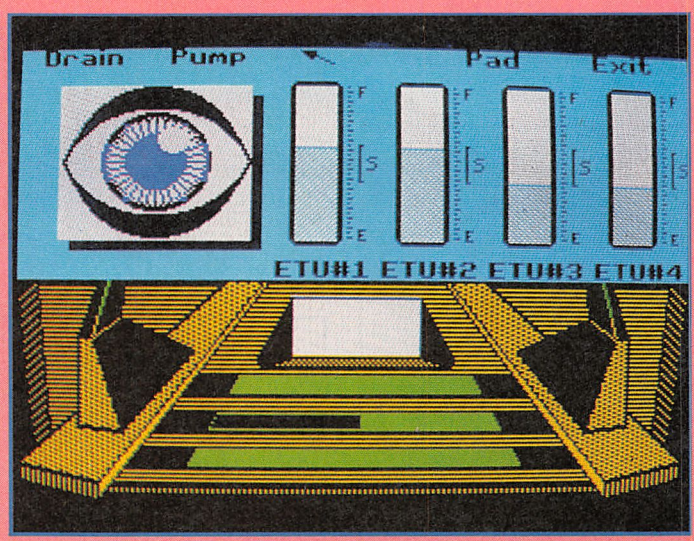
If you spend too much time trying to find the ETUs the Scrim will start to overrun the tunnels, building their energy draining webs which can cripple your craft, but if you go after the Scrim and don't keep track of the ETUs the whole place could blow up so you have to do a balancing act between the two as you find your way around.

One of the things that usually irritates me with this type of game is the aimless wandering as you try and figure out where you are or where you're going, but the map screen – and a supply of electronic markers – eliminates this aspect of the game, allowing you to get on with the serious business of blasting the Scrim to bits. There's even a 'navigation lock' that allows you to home in on the ETUs if you need to get there in a hurry.

Thanks to the quality of the graphics and animation you can build up to quite a pace as you go on a high-speed chase down the tunnels. I don't think I've seen any game of this sort on the Spectrum that manages to move quite so quickly or smoothly, and it's this that makes *Micronaut 1* so much more enjoyable to play than most other maze games. The tunnel system is pretty complex, so it's unlikely that you'll finish the game in your first few attempts. As with most games of this sort my only doubt is whether there's enough variety in it to keep you interested through all the time needed to fully explore the tunnels. After all, one wire-frame tunnel looks very much like another after a while – but *Micronaut 1* is certainly one of the best of its type that I've seen for the Spectrum.

**Cliff Joseph**



◀ continued from page 41

Arcade **Price** £8.95 **Supplier** Ocean, 6 Central Street, Manchester M2 5NS.

*Head Over Heels* is probably my choice for 8-bit game of the year. Buy it.

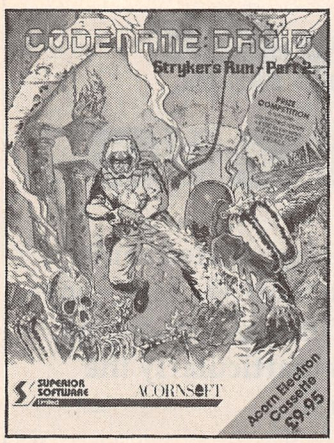
## Acorn Electron

**Program** *Graham Gooch's Test Cricket* **Type** Simulation **Price** £9.95 tape, £11.95 disc **Supplier** Audiogenic, 12 Chiltern Enterprise Centre, Station Road, Theale, Berkshire RG7 4AA.

**Program** *Code Name: Droid – Stryker's Run Part 2* **Type** Arcade **Price** £9.95 tape, £14.95 disc **Supplier** Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX.

## BBC/Master

**Program** *Code Name: Droid – Stryker's Run Part 2* **Type** Arcade **Price** £9.95 BBC tape; £11.95 BBC/Master disc; £14.95 Master Compact disc **Supplier** Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX.




**Program** (BBC only) *Graham Gooch's Test Cricket* **Type** Simulation **Price** £8.95 tape, £11.95 disc **Supplier** Audiogenic, 12 Chiltern Enterprise Centre, Station Road, Theale, Berkshire RG7 4AA.

**Program** *Ultracalc 2* **Type** Application **Price** £29.95 on Rom **Supplier** BBC Soft, Woodlands, 80 Wood Lane, London W12 0TT.

Spreadsheet program, recently reduced in price from £79.50.

**Program** *Monitor* **Type** Utility **Price** £19,95 on Rom **Supplier** BBC Soft, Woodlands, 80 Wood Lane, London W12 0TT.

Machine code monitor and editor, also cut in price from £39.50.

## Commodore/ Amiga

**Program** *Barbarian* **Type** Arcade adventure **Price** £24.95 **Supplier** Psygnosis, First Floor, Port of Liverpool Building, Liverpool L3 1BY.

See panel for comment.

## Commodore 16/ Plus 4

**Program** *Zolyx* **Type** Arcade **Price** £1.99 **Supplier** Firebird, 64–76 New Oxford Street, London WC1A 1PS.

**Program** *Xadium* **Type** Arcade **Price** £1.99 **Supplier** Mastertronic, 8–10 Paul Street, London EC2A 4JH.

The first sequence is dead boring, but if you can get past that you'll find a perfectly passable shoot 'em up.

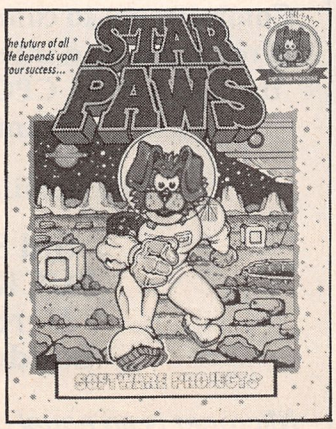
**Program** *Demolition* **Type** Arcade **Price** £5.95 **Supplier** Anco, 35 West Hill, Dartford, Kent.

*Breakout* for the C16, with 36 levels. More varied than the original *Breakout* game, but not quite in the *Arkanoid* class.

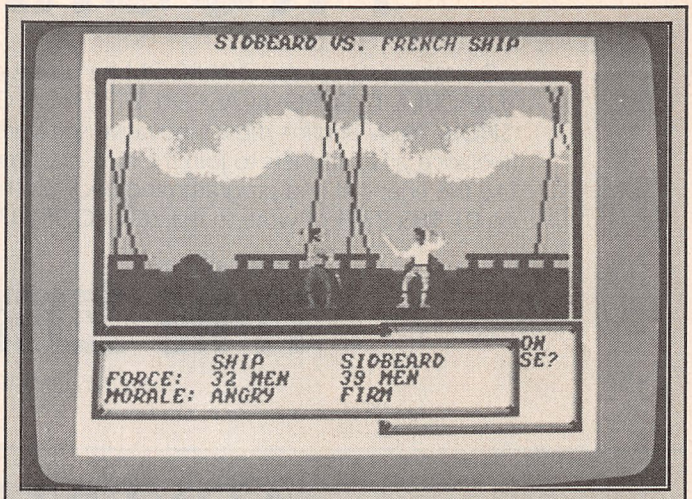
**Program** *Terra Nova* **Type** Arcade **Price** £7.95 **Supplier** Anco, 35 West Hill, Dartford, Kent.

## Commodore 64

**Program** *Star Paws* **Type** Arcade **Price** £5.95 tape, £10.95 disc **Supplier** Software Projects, Bearbrand Complex, Allerton Road, Woolton, Liverpool, Merseyside L25 7SF.




continued on page 45 ▶




**Ahoy, me 'arties, shiver me mainbrace, and scrape me barnacles, there be pirates on the 'igh seas.**

***Pirates* from Microprose, that is, the latest offering from the company that brought you the wondrous *Gunship* – and two more different games are hard to imagine.**

**What's also impressive is the fact that both were written by more or less the same programming team. As Bobby Robson might say, Microprose have width as well as depth.**

***Pirates* is hard to categorise: part role-playing game, part adventure, part arcade game, part strategy game.**

**You play a would-be privateer in the 17th century, just starting out on your career of piracy. You have to win a ship and earn the respect of your crew. And you don't win their respect by discoursing on the moral philosophy of pacifism.**

**You succeed by stomping on every Juan, Dick and Harry who sails across your path with much firing on broadsides and slicing of gizzards.**

**If you're tough enough, and smart enough, you can also sack and pillage the various towns and ports around the Caribbean, carrying off sacks of gold and trade goods.**

**But an excess of gizzard-slitting and mainbrace-slicing pales after a while, so you also have to get involved with the politics of colonial life. Get in solid with various governors, woo their daughters, ransom sundry members of the nobility, do a bit of honest trading to keep on the good side of various nations.**

**Because although a pirate's life is a happy one, the wise captain has an eye on his retirement. This is a time of rampant Thatcherism, of private pensions, private health and no welfare state.**

**Just to keep you on your toes, you can also buy treasure maps from shady characters in harbourside taverns, and seek information regarding your long-lost sister, kidnapped by some unsavoury Spaniard.**

**The presentation in *Pirates* is excellent – it comes with an 80-page manual, large map of the Caribbean, and a double-sided disc. Sea battles and duels with sword or cutlass are done arcade-style, you can consult the ship's log for various information regarding towns and ports, and there are neat snapshot graphics of tavern scenes, the merchants' shops, and the governors' palaces.**

**So what stops *Pirates* from a Hall of Fame entry? Only that the graphics fall a little way short of excellence. If Microprose had managed to incorporate graphics of the standard of, say, *Defender of the Crown*, *Pirates* would have been nearly perfect.**

**We haven't seen the cassette version, but be warned: *Pirates* is a complex multi-loader on disc. A cassette version promises to be either nearly unplayable, or drastically cut down. Try before you buy.**

**But on disc it's a great, swashbuckling game, enormously good fun and should keep you playing for months.**

**Peter Worlock**

# PROGRAMMERS

Over the last year the ZEN ROOM has produced some of Europe's top games, like TAU CETI, DRACULA, CYBORG, ACADEMY, DEATH OR GLORY, BALLBREAKER and THE ROCKY HORROR SHOW. Now Britain's most innovative software development team are looking for experienced freelance programmers to join them. If you have just written a game or are about to and would like the financial and programming back-up the ZEN ROOM can offer contact **Michael Hodges** on **01-985 2391** or write to the ZEN ROOM, Unit 7D, Kings Yard, Carpenters Road, London E15.

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**allows generation of complex tunes and sound effects on 3 channels while your program keeps on going.**

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**Commitment to computer communication is required, and interest in one or more of the ST, Amiga, CPC and PCW machines advantageous.**

**Full details, please, to:**

**Sid Smith**
**MICRONET**
**8 Herbal Hill**
**London EC1**

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◀ continued from page 43

**Program** *Road Runner* **Type** Arcade **Price** £9.99 tape, £14.99 disc **Supplier** US Gold, Units 2/3, Holford Way, Holford, Birmingham B6 7AX.

**Program** *Kik Start 2* **Type** Racing simulation **Price** £1.99 **Supplier** Mastertronic, 8–10 Paul Street, London EC2A 4JH.

**Program** *Slap Fight* **Type** Arcade **Price** £8.95 **Supplier** Ocean, 6 Central Street, Manchester M2 5NS.

Another conversion of an arcade shoot'em up. *Slap Fight* is a perfectly good game, but somehow fails to stand out from the hordes of similar games around at the moment.

**Program** *Pirates* **Type** Simulation **Price** £14.95 tape, £19.95 disc **Supplier** Microprose, 2 Market Place, Tetbury, Gloucestershire GL8 8DA.

See panel for comment.

**Program** *HERO* **Type** Arcade **Price** £1.99 **Supplier** Firebird, 64–76 New Oxford Street, London WC1A 1PS.

## IBM PC and Compatibles

**Program** *First Calc* **Type** Application **Price** £29.95 **Supplier** Minerva Systems, 69 Sidwell Street, Exeter EX4 6PH.

## Spectrum

**Program** *Micronaut 1* **Type** Arcade **Price** £9.95 **Supplier** Nexus, DSB House, 30 High Street, Beckenham, Kent BR3 1AY.

**Program** *Pneumatic Hammers* **Type** Arcade **Price** £1.99 **Supplier** Firebird, 64/76 New Oxford Street, London WC1A 1PS.

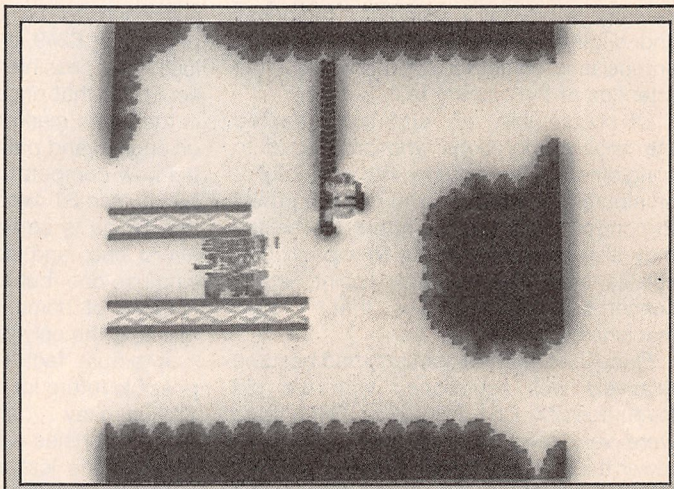
**Program** *Ultima Ratio* **Type** Arcade **Price** £1.99 **Supplier** Firebird, 64/76 New Oxford Street, London WC1A 1PS.

Rather stiff shoot 'em up, which looks like a budget version of *Light Force*, but doesn't have the same speed or smoothness of play.

**Program** *Captain Kelly* **Type** Arcade **Price** £2.99 **Supplier** Bug Byte, Victory House, Leicester Place, London WC2H 7NB.

**Program** *Election* **Type** Simulation **Price** £9.95 **Supplier** Virgin Games, 2/4 Vernon Yard, Portobello Road, London W11 2DX.

**Program** *Zenji* **Type** Board game/Strategy **Price** £1.99 **Supplier** Firebird, 64/76 New Oxford Street, London WC1A 1PS.



***Codename Droid*** **is the sequel to Superior Software's successful *Stryker's Run*, the arcade game featuring the exploits of John Stryker in the war against the Volgans.**

**I'm not quite sure why this new game has got 'Droid' in the title, but it's still one of the best BBC games I've seen for a while.**

**This time around you have to storm the planet Volga itself and fight your way past all their defences in order to capture the secret of Z11 – a revolutionary new spacecraft which will tip the balance of the war in your favour. The Volgan defences are arranged in four zones, each divided into three sectors, patrolled by Volgan soldiers, and as well as blasting your way past all of these, you also have to locate four fuel pods and a navigational Rom that are needed to get the Z11 going.**

**You are armed with a blaster, a defence suit and a portable computer, but to make it all the way you will need to collect a variety of objects that will help you past some of the obstacles. There are energy cells for recharging your suit and blaster, passcards to activate the lifts between each sector, and all sorts of equipment that you'll have to fathom out for yourself.**

**The controls have been kept nice and simple – up, down, left, right, and so on, so the action isn't slowed down by having to use ten fingers at a time. The game itself has been quite well thought out, and it's just hard enough to be a challenge without being frustrating, so the chances are that you'll keep on going back to try and finish it.**

**The relative inexperience of BBC arcade programmers is shown up by a couple of minor points that would probably not be found in a Spectrum game, the lack of user-defined controls is an oversight, and the single fixed route through each sector is something that might detract from the long term addictiveness of the game. (You can only go through those first few sectors so many times without getting bored.) But while *Codename Droid* might not be state of the art games programming compared to the Spectrum or C64 market, in the BBC market it's pretty outstanding.**

**Cliff Joseph**

# CHARTS

## Top Twenty

| | | | |
|---|---|---|---|
| 1 | (3) | Barbarian | Palace |
| 2 | (2) | BMX Simulator | Code Masters |
| 3 | (1) | The Last Ninja | System 3 |
| 4 | (6) | Milk Race | Mastertronic |
| 5 | (20) | I Ball | Firebird |
| 6 | (8) | Four Great Games | Microvalue |
| 7 | (4) | Paperboy | Elite |
| 8 | (6) | Football Manager | Addictive |
| 9 | (7) | Gauntlet | US Gold |
| 10 | (10) | Feud | Bulldog |
| 11 | (–) | Kit Start II | Mastertronic |
| 12 | (9) | Stormbringer | Mastertronic |
| 13 | (12) | Six Pack | Elite |
| 14 | (14) | Olympic Spectacular | Alternative |
| 15 | (11) | Army Moves | Imagine |
| 16 | (19) | Around the World in 40 Screens | Superior |
| 17 | (–) | Ghost Hunters | Code Masters |
| 18 | (–) | Fivw Star Games 2 | Beau Jolly |
| 19 | (–) | Big Four | Durell |
| 20 | (–) | Brainache | Code Masters |

**All figures compiled by Gallup/Microscope**

# PUT THE FUN BACK IN!

Hands up anybody who is reading this and has found themselves becoming less and less inspired by the current stale state of the computer industry. Our industry is gradually losing the freshness and originality that created thousands of enthusiastic computer buffs and drew the attention of the country to it.

Of course this very attention attracted the large corporations who proceeded to conglomerate the industry into a handful of omnipotent companies who had the power to control the industry's future. To be fair they also brought stability to a previously volatile area. But my main point, which concerns the present, is that of new machines.

Once the computer industry had become relatively well established with the old favourites (ZX, C64, BBC, even CPC) there were very few new machines (and even fewer that had any great success – R.I.P., Memotech, etc). Although there are some exciting new computers at the top end of the home market (e.g. the ST and Amiga), there have been very few developments in the sub £250 bracket. The only exception seems to be a couple of rehashed Sinclairs which should have been released in 1985–6, not mid 87.

When Sir Clive decided that he had had enough of the competitive home market and sold up to Amstrad I was initially surprised. Being myself a Sinclair user I have enjoyed the standard 48K machine for many years now and indeed I still use it, but I do recognise its antiquity and certainly would not be fooled into buying an upgraded version of the same outdated technology. Take, for example the +3. It is an admirable enough machine, although released far too late, and when you consider its price (I thought Amstrad machines were supposed to be old technology at low prices?) of £249, it clearly becomes ridiculous – it's possible to buy a basic Atari ST set-up for that price! Besides, the software in the home market has become so utterly un-original and pathetic that the only feasible new computer to buy would, I believe, be an Atari ST (whoops! – let me explain – the Amiga is amazing for those who can afford one, and congratulations to those who use one, but as a replacement for the majority of home users the ST's pricing makes it the only option).

In actual fact I believe that the only possible future for the industry lies with the ST (Oh, okay . . . and the Amiga) and even these machines will have a struggle to rediscover the lost ingenuity and originality necessary to revitalise this once enjoyable industry.

So to end I should like to take this opportunity to verbally spit on Ocean and all originality-destroying companies and ask them one question: Why should it be that a software house cannot produce consistently good (not amazing – just at least respectable) products, which in my opinion they and many other companies fail to achieve?

I now understand why Sir Clive got out while hopefully he still had some of his inspiration and intelligence left. I patiently await his comeback which I hope will revive the industry, and be the bane of corporations!

**Paul Tebbutt**

**Puzzle No 266**

Jamie was mooching around the Summer Fete the other day when his attention was taken by a 'lucky dip' game. For the payment of just 10 pence you could draw a straw inside which was a rolled-up raffle ticket. If the total obtained by adding together the digits on the ticket was 15 you would win a shiny £1 coin.

On questioning the stall-holder, Jamie learned that at the start of the day there had been 999 straws, the tickets being numbered from 001 to 999 in sequence.

This set Jamie wondering just what his winning chances would be, and also if there was a total other than 15 that would be more advantageous to the player.

**Solution to Puzzle No 261**

The millionth digit is a '1', and it is the left-hand digit of the number 185185.

The program simply counts upwards from 1, at each stage counting the number of digits used so far. This is done by converting the number into a string and then finding the length of this string and adding this result to the running total. When this total exceeds one million, the program execution stops.

In order to keep an eye on what is going on, line 45 prints an updated set of figures each time that the digital total exceeds each block of one thousand digits.

Programming note: On some computers when a string variable is created from a numeric variable by use of the STR$ command, an extra leading space is inserted at the left-hand end of the string. For example, the line:

```
X=12345 : X$=STR$(X) : PRINT LEN(X$)
```

would, on some computers, give a string length of six and not the expected five. This is because the string X$ consists of "x12345", where the 'x' denotes the position of the space.

**Winner of Puzzle 261**

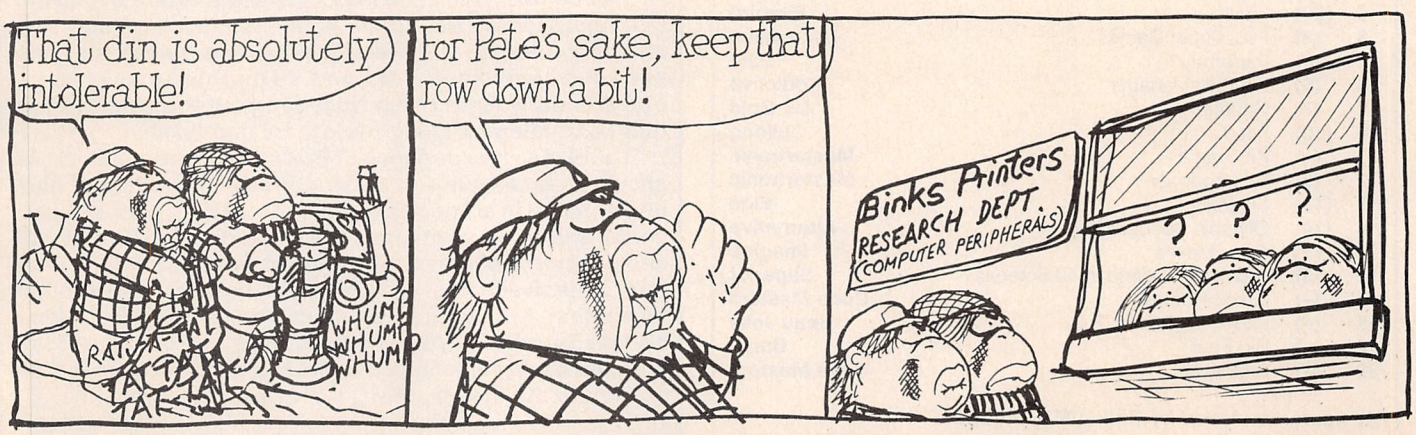
This week's winner is Shu-Wei Wu, of London W2, who will receive £10.

**Rules**

The closing date for Puzzle 266 is August 5.

```
 10 D=0:X=0
 20 N=1
 30 N$=STR$(N):L=LEN(N$):D=D+L
 40 IF D>1000000 THEN 100
 45 IF D>X THEN PRINTN;"  ";D:X=X+1000
 50 N=N+1:GOTO 30
100 PRINTN$;"  ";D
```

# HACKERS



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### 'LOTUS PLUS GEM'

Probably the most impressive program to have been released so far for the Atari ST range, VIP Professional is an extremely easy to use, integrated spreadsheet, database and graphics program which is identical both in features and commands to Lotus 1-2-3™. To give you the best program possible on your Atari ST, VIP Professional integrates the three essential applications of Lotus 1-2-3™ with the smart face of GEM. The same spreadsheet analysis, information management and extraordinary business graphics are all combined in one easy to learn, affordable package. What's more, VIP Professional not only has all the features of 1-2-3™, you can also type the same commands to do the same things. Or, better still, you can use a mouse to make it even simpler! VIP requires only one disk drive to operate and also works with a hard disk drive. It is compatible with both monochrome and colour systems. Probably the most surprising feature of VIP Professional is not its total compatibility with Lotus 1-2-3™, nor its ease of use with the GEM environment, but its price. Lotus 1-2-3™ for the IBM PC AT costs £395 (+VAT=£454.25), whereas VIP Professional for the Atari ST range of computers is a mere £199 (+VAT=£228.85). That's nearly HALF PRICE!

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### 1 SPREADSHEET

VIP Professional was modelled after the powerful, best selling Lotus 1-2-3™ program. It has every feature, every command of that program. In fact, the experienced 1-2-3™ user will feel right at home using the same keystrokes. But this version is made even easier to use by adding the user friendly face of GEM, so the beginner can use it right away. If you want to do your home budgets, financial planning, or sophisticated business inventory control or budget modelling, VIP Professional will fit the bill. And you can freely use 1-2-3™ or VIP Professional files created on other computers in VIP Professional on your Atari ST. And Professional is not only flexible, it's powerful too, with a full 8,192 row by 256 column worksheet to use with up to a massive 4Mb of memory. (Note: Lotus 1-2-3™ has only 2,048 rows).

### 2 DATABASE

VIP Professional includes a powerful data manager to arrange, store and analyse your important information. It can be used to store your home or business records and do extensive searches, sorts and comparisons. It allows up to 8192 records, with up to 256 fields and queries and 256 search criteria. The database manager can be used in conjunction with the spreadsheet commands to add greater power to the database facilities including sorting specific ranges of the database. You can also specify how you sort files, from the highest value to the lowest value (or from the lowest to the highest), or alphabetically (forwards or backwards). The graphics part of VIP Professional can be used to show trends in the database or other information. With its powerful statistical functions, it has almost limitless power.

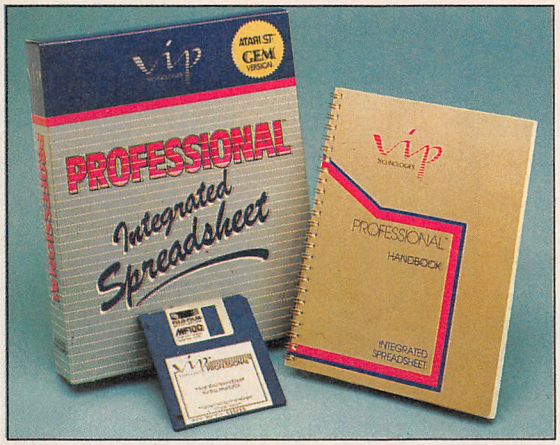
### 3 GRAPHICS

VIP gives shape to your figures by letting you graph your data into six different types of graphs, in startling colour or black and white. Pie charts, bar graphs, stacked bar graphs, line graphs, scatter graphs and X/Y graphs. You can graph your spreadsheet or database data to give instant professional presentations. Your graphs will change instantly as you change the data. When creating a graph you may specify a main heading, a sub heading and a third title at the base of the graph. The necessary scales can be defined either by the user or automatically created. In pie graphs, the most important section of the pie can be separated from the other sections to draw attention to its importance. You may save graphs individually on disk for use at a later date. You can also print your graph on any Epson compatible dot matrix printer.

- VIP Professional has 'Instant Help' so you can find more information instantly.
- VIP calculates to a full 300 digits against Lotus 1-2-3™ which only calculates to 100.
- VIP allows for 256 Query Fields against only 32 allowed by Lotus 1-2-3™.
- VIP has a complete GEM interface, for ease of use, unlike the text of Lotus 1-2-3™.
- VIP allows different fonts and has an on/off cell grid. Not found in Lotus 1-2-3™.
- VIP supports greater memory and larger spreadsheets than Lotus 1-2-3™.
- VIP graphs and worksheet can be viewed together. Pie charts can be exploded.
- VIP can accept any .WKS files from Lotus 1-2-3™ without modification.
- VIP displays all spreadsheet information in user-sizeable GEM windows.
- VIP can be manipulated using either the keyboard or the user friendly mouse.
- VIP is currently available for the AMIGA, ST and APPLE IIc, IIe and IIGS.

### *OFFICIAL UK VERSION*

The official UK version of VIP Professional has a pound (£) sign as a standard part of its character set. Other versions have also been imported unofficially from the USA and have a dollar ($) sign instead of a £ sign. These versions will not be supported by the UK distributors or their dealers. Ensure that the VIP you buy is the official UK version, not an unofficial import with incorrect characters.




VIP Professional is available from Atari ST Dealers throughout the UK. If your local dealer does not have VIP in stock, it can be obtained by mail order (P&P free) from:

**SILICA SHOP Ltd, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX Tel: 01-309 1111**

All comparisons made to Lotus 1-2-3™ are to version 1A. E&OE

## INFORMATION REQUEST FORM

To: Silica Shop Ltd, Dept PCWK 0787, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX

**Please send me further details of VIP Professional for the ST**

*Mr/Mrs/Ms:*..... *Initials:*..... *Surname:*.....

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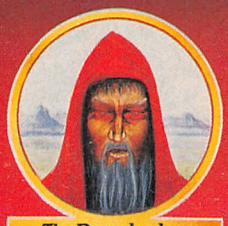

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